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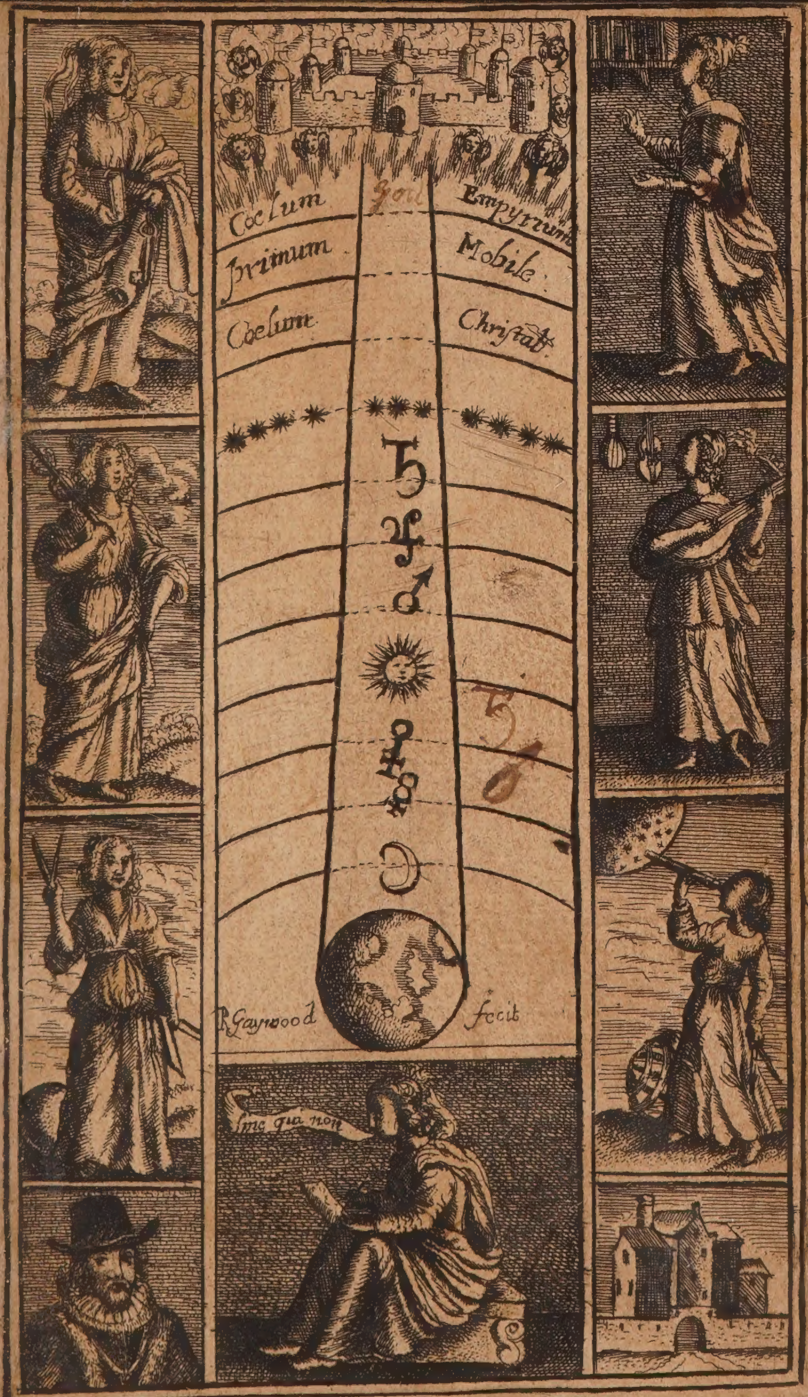
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# The Myſtery of
# ASTRONOMY
# Made plain
# To the meaneſt Capacity,
BY
## An Arithmetical Deſcription of the Terreſtrial and Celeſtial Globes.

Briefly ſhewing (by way of Queſtion and Anſwer)
the wonderful works of God, from the earth
his Footſtool, to his Throne of heaven.

With Divine Obſervations upon every part thereof.

Alſo, Two TABLES: the one, for Contents; the
other, for Explanation of Hard words.

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By *W.B.* an honourer of ARTS & SCIENCES.

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Jer.10.12. *He hath made the earth by his power, he hath eſtabliſhed the world by his wiſdom, and hath ſtretched out the heavens by his diſcretion.*

Pſal.111.2. *The works of the Lord are great, ſought out of all them that have pleaſure therein.*

Pſal.9.1. *I will ſhew forth all thy marvelous works.*

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I Have ſeriouſly peruſed this Treatiſe, intituled *The Myſtery of Aſtronomy*, &c. in which is contained much variety of moſt excellent Learning: I do conceive it very worthy the publike view, and do willingly give my approbation thereof. *Sept.25.1654.*

*Imprimatur.* JOHN BOOKER.

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*London,* Printed by *J. Cottrel,* for *Will Larnar,* at the Black-
moors head neer Fleet bridge. 1655.

# To the Great Example of Fidelity to the Dead, And of ingenuous goodneſs to all men Living,

## *Thomas Buſhel* Eſquire,

Inheritor of the vertues of
his moſt noble Lord
Sir *Francis Bacon.*

*Honored Sir,*

OBſerving your firm reſolution, and unwearied endeavors, to fulfil thoſe glorious commands of your admired Lord and Patron Sir *Francis Ba-*

*con*, (the great Advancer of Learning, and higheſt honor of our Engliſh Nation) in laying the foundation of his much-deſired COLLEDGE; where he propoſed to himſelf, as his greateſt happineſs (next heaven) to have all Arts and Sciences not onely improved, but converted to true uſe and wiſdom.

It being a portion of Felicity I could not hope for, to be as it were raked out of the duſt of Obſcurity, by your moſt clear and ingenuous goodneſs, and to have my weak skill in Arts ſo highly regarded, and my long-neglected Labours (in my Arithmetical obſervations & proportions upon the Terreſtrial and Celeſtial Globes, viſibly demonſtrated in my Spheres) ſo honoured, as to be made the firſt ſtone to ſo eminent a Fabrick; it gave me encouragement, and ſet me on this work, to diſcover the true uſe thereof, that God might be glorified thereby, and all men be made wiſe and judicious in the knowledge and conſideration of his moſt wonderful works.

Which being perfected, in due thankfulneſs, and true honour to your vertues, I dedicate the ſame unto you, as being willing to ſpeak your *con*, (the great Advancer of Learning, and higheſt honor of our Engliſh Nation) in laying the foundation of his much-deſired COLLEDGE; where he propoſed to himſelf, as his greateſt happineſs (next heaven) to have all Arts and Sciences not onely improved, but converted to true uſe and wiſdom.

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Which being perfected, in due thankfulneſs, and true honour to your vertues, I dedicate the ſame unto you, as being willing to ſpeak your juſt praiſes to all poſterit that after-ages may kno they owe the benefit of th Diſcourſe, and of my Mod of the Spheres (the firſt this kinde) to your name: but for whoſe induſtriou goodneſs, and ſearching ſp rit, it might have been ſti buried in oblivion.

Sir, for all your Favour which are more then I ſha here expreſs, I muſt ever ſu ſcribe my ſelf

Your humble Servant,

*Will. Bagwell.*

# The Occaſion and Inducement to this WORK:

Publiſhed by the Author, to the end that by obſervation thereof, men in high and proſperous eſtate may not preſume, nor in lowe condition deſpair; but through meekneſs, wiſdom, and patience, turn all to the beſt, that is, to Gods glory.

*BEing bred a Merchant in good quality, skilfully furniſhed with knowledge in all things neceſſary, and having ſeen the world abroad, and ſetled my correſpondence in many conſiderable places; having a full and compleat trade for ſome yeers, credit at will, my ſelf, wife and children having plenty with contentment,* * *and therewithal friends in abundance, my kindred alſo and my acquaintance being full of proteſtations of moſt zealous affection; I was taken up wholly either with buſineſ, or*

* Prov. 19. 4.

*invitations, pleaſing my ſelf ſometimes*
*Muſick, ſometimes in the Mathematick*
* Acts 17. 21 *and though never extravagant, * yet b*
*tween whiles in chat,& fruitleſs diſcourſ*
*News, and as vain and various ſubject*
*Swimming in this jolly condition, as a m*
*of this world, ſeldome ſeriouſly,but rath*
*curſorily applying my thoughts on the thin*
*of God; I was in a moment made to kno*
*I was born to other purpoſe.*

*And although I muſtered up all th*
*ſtrength I was able, and made head a lo*
*Pro.6.11. *time againſt it, yet* poverty came on a*
*mighty man, and would have no reſiſtanc*
*Ch. 23.5. *and* riches made to themſelves wings, a*
*flew away far faſter then they came: m*
*croſſes came not alone,but in heaps upon m*
*Job 1.16, 17,18. *and thick, * one in the neck of another:*
*firſt, great loſſes beyond the ſeas, occaſion*
*by the difference between our Nation a*
*the French; then ſome loſſes at ſea,and t*
*failing of many debtors;and then my cre*
*ſomewhat queſtioned upon the Exchang*
*and ſoon after, ſcrupled beyond Seas: a*
*thereupon,(the bane of falling Merchant*
*the perfidiouſneſs of my Factors in delay*
*returns, creating difficulties and diſpute*
*multiplying uncomfortable Letters,but pa*
*ting neither with goods nor money) ſome*
*which ſymptomes of a crazie eſtate,I hid*
*to*

*ay poſſibly I might be inſtrumental in the*
*dvancing of his glory: wherefore making*
*at priſon my Colledge,* I became ſtudious* *Pro.8.12.
*the Art of Arithmetick, and in ſome*
*w yeers compoſed a Work intituled* The
yſtery of Arithmetick, (*not yet publiſh-*
*l:) a Work very uſeful, profitable, and de-*
*ghtful to people of all degrees and callings*
*hatſoever. And afterwards (* being free* *Pſa.88.8.
*om the cares I formerly had, and from the*
*urteous viſits of friends, who were then*
*ſtrangers to me) I applied my ſelf to the*
*udy of this Arithmetical deſcription of*
*th the Globes; in which kinde of ſtudy I*
*as ſo delighted, that I could give my ſelf*
*reſt until I had compleated the ſame as*
*ell as I could in that place of reſtraint.*
*ut when it pleaſed God I was thence deli-*
*ered and ſet at liberty,* I was by ſome no-* * Pſal. 37. 34.
*le friends put upon ſome good employment,*
*hereby I was the better enabled to give the*
*ork that luſtre, with ſome ſmall glimmer-*
*gs of beauty, and reſemblance of glory,*
*hich I thought it worthy of; and which be-*
*g (by ſome ſpectators) made known to Di-*
*ines, and to perſons of greateſt skill in A-*
*ronomy and in the Mathematicks, and of*
*he learned in all Arts, they ſo highly eſtee-*
*ed and approved thereof, as they judged it*
*oſt worthy to be placed in ſome eminent*

University,Colledge,or Library, for the g
*1 Cor.10. neral good of Students, & others deligh
31. in ſuch noble Sciences, * as tend ſo excee
ingly to the advancement of Gods glory.

And therefore being thus encourage
have long waited for ſome fair oportuni
but have found none ſo acceptable, as
erection of Sir Francis Bacon's Collea
intended to be eſtabliſhed in Lambe
Marſh neer London, where God willin
ſhall remain as a teſtimony of my zea
*Prov.9.9 affection to the furtherance of ſo worthy
Inſtitution*for the advancement of Le
ning.

But conſidering that this my Work co
be but in one place,where though many m
be bettered by the ſight thereof,yet the kno
ledge it imported concerned all mankin
therefore I conceived it my duty to proc
further, in diſperſing the ſame by famil
Queſtions and Anſwers, and to raiſe ſ
Obſervations thereupon,as I had found m
profitable to my ſelf : which this Book p
ſents you withal, to the end that God, e
by the meaneſt capacity, may be glorified
his works,that man may be truly humbl
*Iſai.33.5. *and the name of the Lord exalted throu
out all generations.

Your well-wiſhing friend,
Will. Bagwe

Ex fructu cognoſcitur arbor.

# *To the Good-natured Chriſtian* READER.

WOnder not that I am willing to finde my Readers thus-qualified, that is, good-natured Chriſtians; one without the other in no meaſure anſwering my deſires. I would finde them ſo, for mine own ſake: for then I ſhould be ſure to have theſe my endeavours not onely kindly accepted, but improved by them to the glory of the * God of Nature, and to the praiſe of * the Father of our Lord Jeſus Chriſt. And thoſe I finde not ſuch, I would yet gladly leave them ſo qualified, before they enter upon the enſuing Diſcourſe, or well prepared towards ſo happie a compoſure of ſpirit. To which end, I ſhall pray them in the firſt place ſeriouſly to weigh what our Noble Advancer of Learning hath obſerved touching goodneſs of Nature: “Goodneſs (ſaith he) I call the habit;

*Heb.2.16
*Rom.15.6

“and goodneſs of nature, the inclina-
“tion. This of all vertues is the grea-
“teſt, and without which, Man is a miſ-
“chievous, buſie, wretched thing, no
“better then a kinde of vermine.

Another (excellent in wiſdom) was
ſo tranſported in affection to it, that he
affirms, that God gives not the know-
ledge of his love in Chriſt to any, but
* Rom.15. 14. * ſuch as cheriſh good nature in them-
ſelves. However, this I conceive is
certain, that Chriſtian Religion never
ſhews ſo gracious, as in good, wiſe, and
conſiderate people, ſuch are good-na-
tured. So that where this happie mar-
*1 Joh.4.10 riage of a benigne nature, * and the
knowledge of the love of God in Chriſt
is made in one perſon, ſuch do I wiſh all
*Luk.8.15. my Readers, ſuch I eſteem * good and
clear-minded Chriſtians, and ſuch alone.
Therefore, whoever you are, content
not your ſelves with the one, without
the other; but labour by all good means
to attain and grow ſtrong in both, there
being great ſcarcity and want of ſuch
in this generation.

That meer men ſhould be * without
*2 Tim.3.3. natural affection, the Apoſtle deemed
worthy of a ſharp reproof. But men
taking the holy Scripture for their Rule,

to profeſs the Name of Chriſt, and t
march in a * form of Religion, and yet not to arrive at ſo much ſweetneſs of converſation, as what good nature doth imprint or dictate, doubtleſs is moſt ſhameful: yet ſuch (if good men are not very much miſtaken) is the ſad condition of many in our times.

Religion and Chriſtianity never indeed more in diſcourſe: but for * gentleneſs, and * brotherly kindneſs, and plain-dealing true-heartedneſs, * ſelf-denial, and to be tenderly affectioned one towards another, alas, where is it? * Where is that orderly reſpect to age, and juſt relation, as ought to be? What is become of * love to perſons for goodneſs ſake? Where are thoſe that lay out themſelves for the advancement of true knowledge and underſtanding, or in other neceſſary and uſeful works? Whither is fled * that ſoftneſs and mildneſs of ſpirit that adorns a Chriſtian? What ſobriety and moderation in ſpeech, which makes way for truth? Where is that bearing and forbearing one another in love?

*Gal.5.22.
* 2Pet.1.7.
*Luk.9.23.
* Levit.19.32. Iſa.3.5.
* Pſa.15.4.
* Gal 6. 1. 1 Pet.3.4.

Be there but a Diſpute or Controverſie in ſome high points in Divinity at any place to be diſcuſſed, (as if Religion

ed onely in words ) multitudes haſtily thither: but there alſo their folly is ſoon made manifeſt ; ſuddenly engaging, and taking ſides , in ſuch rugged, unſeemly, clamorous, courſe behaviour, as would not be ſeemly at a Market. And what is the reaſon , but the general want of keeping ſuch Rules and Obſervations as Nature it ſelf doth continually adviſe? Such Chriſtians as thoſe, have not ſtudied nor conſidered
*Jam.2.14 what Good-Nature is ; but*whilſt they boaſt of faith and divine knowledge, are defective in diſcretion.

And ſhould ſuch as theſe ( whilſt ſuch) take this Diſcourſe in hand, without or before an alteration begotten in them by this preparative, What would it profit them ? Certainly it would but paſs thorow them, as other Diſcourſes, and as even the Scriptures often do,
*Jer.16.10 * without any ſavour of good wrought in them, nor they one tittle the better for it , and but onely puff them up,furniſhing their after-diſcourſes with flouriſhing ſtories of the wonders they find herein, meerly for oſtentation-ſake : a ſervice I ſhould be ſorry my Labours, how mean ſoever, ſhould be put unto.

And therefore , to meet with theſe

ill-natured, or ill-nurtured Chriſtians, (if the name of Chriſtians they at all deſerve) is the principal intent of this Epiſtle, as foreſeeing them the hardeſt to be wrought upon by the enſuing Diſcourſe; their ſlightneſs, and want of conſideration, rendering their conſciences ſomewhat worſe then ſenſleſs, inclining rather to the * *Laodicean* temper of neither hot nor cold, luke-warmneſs and neutrality in zeal and affection: a thing loathed of God, and deteſtable to all good men.

*Rev.3.14, 15,16.

But if through this quickning preparative, (for ſuch it is intended) they ſhall in the due fear and awe of God, with clearneſs of minde and ſpirit, read the enſuing Diſcourſe, and lay to heart his wonderful works therein appearing, it is very much to be hoped, that the conſideration of thoſe his marvelous works of Nature, * ſo orderly and wiſely diſpoſed, may further ſway their conſciences into a ſelf-examination and enquiry, wherein, and in what particular, even according to Natures light, themſelves, though Chriſtians, may be yet to ſeek, and out of courſe; and prove an effectual means to rectifie their judgments, and to perfect their converſations for

*Jer.51.15

the future ; and ſo they may become a real honour to their holy profeſſion, and be made * fit publiſhers of the praiſes and mighty works of God : which is the hearty deſire of

* Pſal. 9. 1.

Your faithful friend,

*Will. Bagwel.*

* * *

To

* * *

# To his ingenious and true friend Mr. *W. B.* upon his *Arithmetical ASTRONOMY.*

*WHen God corrects, his Rod to kiſs,*
*The ready path is unto bliſs;*
*And then to know what is his will,*
*Is the next ſtep to holy skill.*
*This way my pious friend here took,*
*As witneſſeth this uſeful Book.*
*A Work proceeding from a heart refinde:*
*Afflictions furnace is of heavenly kinde;*
*Where this was wrought to ſuch a height,*
*As now comes forth the worlds delight,*
*And ſuch as ne'er was ſeen before:*
*So perfect is this golden Ore.*
*And now I joy, who long was ſad*
*At thoſe great ſorrows you have had.*
*For you ſuch Merchandize do here bring forth,*
*So rare, ſo glorious, and of ſo great worth,*
*That when I judg'd you worſe then dead,*
*You in your grave were quickened.*

*With pureſt zeal, you did convert that Art*
*Which in a Merchant is the chiefeſt part,*
*From being exercis'd on fading wealth,*
*Which moſt endanger doth mans ſaving health,*
*That you by it us ſhew, in numbers even,*
*Such wonders, as do fix our thoughts on heav'n;*
*Finding ſuch worth in earth, ſeas, air, and fire,*
*As e'en of force, forceth our ſouls up higher,*
*And higher ſtill, till dazled with the glory,*
*We make a ſtand, and then admire the ſtory*
*Of ſuch a world of wonders. Looking back*
*Then on our ſelves, it makes ambition crack,*
*And ſhews our ſelves but worms, meer vanity:*
*Then heart we take, from our humility,*
*That's Eagle-ſighted; none dares flie ſo high,*
*None to the throne of grace dares come ſo nigh.*
*This Work doth work that beſt, made to that end.*
*Befriend him all, who to all's ſuch a friend.*

W. W.

To

# To the Author, upon his Celeſtial Arithmetick.

*WHat ſhall I ſay? how high ſhal be my note*
*To warble forth thy praiſe? I doubt my*
*Cannot attain to* Ela: *I wax hoarſe (throat*
*Already, as I view thy counting courſe,*
*And thy ingenious fancy, to pourtray*
*From ſands to ſtars a plain and pleaſant way.*
*Thou mak'ſt our journey ſhort, and yet we ponder,*
*We contemplate, we wander, and we wonder,*
*Hearing thy Queſtions, Anſwers: then we muſe*
*On what w' have read; and ſtraightway what en-*
*We do enquire of, to be jogging on: ſues*
*We make much haſte, not minding what was*
*We wonder as we wander in our way: (done.*
*We oft ſtand ſtill, not knowing what to ſay.*
*Then are our ſouls with holy ecſtaſie*
*Poſſeſt; and what before we paſſed by*
*Regardleſs, through ſupineſt negligence,*
*Quickned by what th'haſt offer'd to our ſenſe,*

*We more exactly mark, and running o're*
*This ſo vaſt frame, the builder we adore.*
*Thus haſt thou wrought in every minde that reads*
*Thy Book, an immaterial world that feeds*
*The pious ſoul, leading him up through all*
*The Sphears, which we Gradations may call,*
*To Heaven it ſelf, that certainly muſt be*
*As higheſt, ſo, ſupream in dignitie,*
*Space, bulk, circumference, beauty, excellence,*
*As that which is the Throne of the Immenſe.*
*Hither thou lead'ſt us, where I hope to be*
*Endeniz'd one day, my dear friend, with thee.*

John Booker.

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To

# To the ingenious Author of his exact and elaborate Treatiſe of Arithmetical Aſtronomy, Mr. *W. B.*

*THe deſign's good; man muſt lay down his proud*
*And haughty claim, and paſt ambition ſhroud*
*Under th' excuſe of ſhallow Ignorance,*
*Lab'ring his almoſt-nothing to advance.*
*Whilſt he had but a gen'ral and groſs ſight*
*Of the capacious heavens, a glimmering light*
*Of their vaſt bulk and their proportion,*
*Their diſtance and admir'd extenſion,*
*And never weigh'd how like an atome he*
*Struts on this ſpot of earth, he well might be*
*Lifted above the pitch of his low ſtate,*
*And his big thoughts to ſomething elevate.*
*But thou haſt now check'd his aſpiring heart,*
*By ſhewing him how deſpicable a part*
*He is of this vaſt Fabrick; and that done,*
*Convert'ſt his pride to adoration,*

*And from that glorious building doſt erect*
*His humbled ſoul to the great Architect. (ſerv*
*Thou doſt not coyn the heavens, making them*
*An avaritious minde: thou doſt not ſwerve*
*From Truth to Fiction, nor advance the trade*
*Of ſuch preſumptuous ſpirits as have made*
*The Spheres their gain, and ſtudy heaven, to b*
*Able t' impoſe on the credulitie*
*Of eaſie ſouls, that would be thought to hold*
*Conference and counſel with the Stars; their bold*
*Hearts daring ſo to tempt the mighty God,*
*And, 'cauſe not ſeen, ſlight his revenging Rod.*
*Thou aim'ſt at ſound and ſolid Truth, that can*
*Endure the ſtricteſt teſt which any man*
*Can make, though* Archimedes *ſelf revive,*
*And yet more skilful engines ſhould contrive.*
*Thy Book 's no ſwelling Volume, ſuch as tires*
*With tedious method, the moſt ſharp deſires;*
*But brief and comprehenſive, making known*
*Not the Diſpute, but the Concluſion.*
*In a ſmall Frame, thou twice doſt repreſent*
*To th' eye and ear the worlds vaſt continent;*
*In this the full diameter we hear*
*Of the earths Globe, and ev'ry different Sphear;*
*Their compaſs, diſtance, bulk, and motion,*
*Each Planets true circumvolution.*

*But ſince the eye is the more certain ſenſe,*
*And deep'ſt impreſsion makes, thou doſt diſpenſe*
*To common ſight, with dextrous Art, in ſmall*
*Character, the epitome of this all;*
*The earth and heav'ns each in their ſtation,*
*Their inter-ſpace in due proportion,*
*In thy ſmall Model, which the mean'ſt may ſee,*
*Thou doſt preſent; which none has done but thee.*
*And all this too, not to advance thine own*
*Or others fame or knowledge; but mak'ſt known*
*Th' Almighty's power, which in few days did frame*
*This glorious Orb, that to this day the ſame*
*Order and courſe he firſt conferr'd, retains.*
*At thought whereof, how ſhould our high-ſwoln veins*
*Fall flat, and all our proud deſignes t'advance*
*Our ſelves (th' effect of ſottiſh Ignorance)*
*Vaniſh like empty clouds, and be diſpers'd*
*By th' wonders in thy Treatiſe are rehears'd!*
*Which makes this Maxime in all ages ſhine:*
*The beſt Philoſopher proves the beſt Divine.*

H. B

To

# To the Ingenious AUTHOR on his exact deſcription of both Globes, accompanied with *his divine Obſervations.*

D*ivine Surveyor, whoſe ſucceſsful skill*
*Meaſures both Globes with one directin*
*(quill,*
*Unlock'ſt each Myſtery, till thou haſt flown*
*From earths low footſtool, to the heav'ns high*
*(throne,*
*And left a track behind, which doth diſplay*
*Thy publike ſoul, in this directive way.*
*Sure more then wax did theſe thy Pinions trim,*
*Which ſoar ſo like (if not) a Cherubim;*
*They've Eagles,* Dædalus, *and all out-done,*
*Thus hov'ring round the body of the Sun;*
*Yet chriſten'd no ſeas with thy posthume name,*
*To purchaſe, by thy death, the alms of Fame:*
*Though you've baptiz'd the Arts, and made them*
*By joyning ſacred hands, Canonical, (all,*

*More lib'ral then before, now truely free,*
*referr'd to this Celeſtial Match by thee ;*
*hat we muſt needs confeſs this Work of thine*
*nſtals thee Mathematical Divine,*
*Vhilſt Doubts unridled from thy Tripod, tell*
*s, that each Anſwer is an Oracle.*
*It's to no boot to invocate the Nine,*
*nce thaw'd by theſe inſpiring flames of thine.*
*Vhat's here return'd, was yours at firſt, whilſt*
*Like rivers) pay our tribute to the ſea : (we*
*nd if that ſalt is loſt it had before,*
*ou that gave that, can ſeaſon it with more.*
*Yet if the Reader chance to queſtion why*
*heſe two obſequious friends are rank'd ſo nigh,*
*h' anſwer's natural : We onely come*
*o fill what's waſte, not to increaſe the ſum.*
*Thus Cypher's plac'd before their digits, be*
*o make the Columns ſtrait, not multiplie.*

Robert Bladwel,
*Philomedicus.*

To

## To his worthy friend the ingeniou Author of this Terreſtrial and Celeſtial SPHEROMETRY.

*THe Globe of th' earth & ſea in one conjoyn*
*Be'ng in regard of heav'n but as a poin*
*And heav'n compared to that infinit*
*Greatneſs of God, be'ng as a point to it :*
*That you, with whom, this little ſpeck contai*
*Millions of greater bulk, ſhould in your brai*
*Have lodg'd the imag'ry of thoſe ſo vaſt*
*Dimenſions ; ſure was but to make us caſt*
*Our eyes on the immenſe Divinity ;*
*Whoſe image that you are , we hereby ſee.*

Tho. Urquhart.

* * *

*ERRATA.*

Page 74. in the Table of the magnitude of the Stars, for 88 read 18 ; and for 22 read 72.

# The Myſtery of
# ASTRONOMY
# Made plain
# To the meaneſt Capacity.

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## Chap. I.

### *Of the Subject-matter and Utility of this Diſcourſe.*

Queſt. *What is the Subject of this Diſcourſe?*

*Anſw.* The Subject of this Diſcourſe is the whole Univerſe.

Qu. *What is that?*

*A.* It is the moſt wonderful Frame of the whole world,* both the heavens and the earth, created by God; and

* Gen.1.1.

which comprehends all his other creatures, there being nothing viſible without the limits thereof : ſo that whatſoever is betwixt the Seat of the ALMIGHTY, and the Centre of the Earth is the proper Subject of this Diſcourſe.

Qu. *Why is this Work intituled,* An Arithmetical deſcription? *&c.*

*A.* Becauſe the form, greatneſs, and diſtances of the heavens and heavenly bodies, as they are in being one above another, even to the eighth Sphere, are made clear to the underſtanding, by this moſt exact, demonſtrative, and infallible Rule of Arithmetical Progreſſion, as the figures in my Spheres are proportionable, and made viſible to the eye.

Qu. *What may profitably be learned by ſuch a deſcription?*

*A.* 1. God's immenſe Greatneſs, and incomprehenſible Majeſtie, * whom the heaven of heavens cannot contain.

* 2 Chron. 2.6.

2. His infinite * Power, in being the ſole Author of ſuch vaſt and glorious creatures.

*Job 37.23

3. His infinite * Wiſdom, in ordering the ſeveral and various motions of the heavens and heavenly bodies ; as, the Sun, Moon, Stars, and Planets, in

* Pſal. 136. 5,7,8,9.

that diſtance they are found to be.

4. His infinite * Goodneſs, in diſpoſing them ſo, as makes moſt for his own glory, the benefit of mankinde and of the world. The ſerious conſideration whereof, * will even aſtoniſh the proud thoughts of men, work in them a ſight of their own weakneſs, and indeed * nothingneſs, and conſequently * Humility the grace of graces, and an awful dread and fear of God, * which is the beginning of wiſdom.

*Exo.34.6.

* Job 37.1. Jer.5.22.

* Iſa.40.17

* Prov.15.33.

*chap.9.10

Qu. *Why doth Arithmetick perform this work better then Aſtronomy alone?*

*A.* In many reſpects. For although Aſtronomy be an excellent Science, and doth give much certainty to the skilful profeſſors thereof; yet to ſuch as are not skilful, the knowledge it contributes is hardly diſcernable, begetting but confuſed notions in moſt mens underſtandings: whereas by this Arithmetical deſcription,

1. Aſtronomers themſelves may be ſtrengthned with a greater and more exact certainty.

2. The learned in any other Science may (as it were) with a glance of their eye upon the Figures, (which could not be reduced into this ſmall Volume, by

reaſon of their vaſt diſtances; but are in true proportion and diſtance to bee ſeen at *Lambeth-marſh*, at the houſe intended for the Lord *Bacon*'s Colledge:) and with a touch of the Pen, and help of the Compaſs,make a true ſolution in an inſtant, of any, even the hardeſt queſtions in this work of Aſtronomy.

3. The conſcientious and painful Divine, when he would draw arguments from the heavens and heavenly bodies to perſwade men to the worſhip of the great and wiſe God, he may by this Arithmetical way of deſcription be furniſhed with plain and viſible demonſtrations exactly calculated.

4. Any ingenious perſon deſirous of ſatisfaction in things of ſo great concernment, may in this way ſoon arrive to a competencie of knowledge, without paſſing through the long ſtudie of Aſtronomy; this of Arithmetick being more obvious to every capacity.

Qu. *What conſiderations doth the terreſtrial Globe afford neceſſary for the underſtanding of the celeſtial?*

*A.* Very many: as firſt, in the Figure appeareth,the ſmalneſs of its proportion in compariſon of the heavens, notwithſtanding its dimenſions and ſubſtance is known to be ſo great and large as it is, Inſtructs wonderfully to the knowledge of the vaſtneſs of the heaven and heavenly bodies.

Secondly, from the largeneſs and certainty of its dimenſions, Arithmetick takes its footing, as upon a ſure baſis, to ground all its after-concluſions, which cannot fail in their certainties.

Qu. *What other conſiderations upon the earthly Globe are neceſſary, before one paſſeth to the contemplation of the heavenly bodies?*

*A.* Truely very many; * it being the place of our abode, until it pleaſe God to call us to himſelf: and it were not wiſdom to be ignorant of any of the works of God which are ſo neer us, but rather in the firſt place to be thorowly knowing in all things here belowe, that ſo we may come by due gradations, as by the Rule of Progreſſion, to know the things above.

* 1 Chron. 29.15.

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## Chap. II.

### *Of the worlds Creation and Continuation.*

Qu. *HOw long hath the world been in being?*

*A.* The Scriptures are our trueſt light to reſolve all queſtions of this nature, (all other Hiſtories being uncertain therein:) and upon the account thereof, exactly taken by Arithmetick, the world hath continued in being 5593 yeers, reckoning to this yeer of our Lord Chriſt 1644, as by the Learned is generally computed.

Qu. *What general obſervation ariſeth from the being of the whole world, and its ſo long continuance?*

*A.* That no ſooner it was, but then was it in the meaſure, and proportion, and motion, wherein, * through the wonderful providence of God, it hath continued even the ſame to this day. *Gen.8.22

Qu. *What was it upon the firſt day of the Creation?*

*A.* A Chaos, which was a huge, im-
* Gen.1.2. menſe, and frameleſs Maſs *, or diſor-

derly confuſed heap, * nothing but obſcurity, and as a continual night, *before God drew the light out of it. * Verſ.3,4. *2 Cor.4.6

Qu. *Where was then the earth?*

*A.* It was hid in the unmeaſurable depth of waters, upon which the * Spirit of God moved, before the light was created. * Gen.1.2.

Qu. *What became of thoſe waters?*

*A.* *Upon the ſecond day of the creation, they were divided from thoſe waters which made the Sea, and placed above the firmament of the Stars into the ninth heaven. * Gen.1.6.

Qu. *What became then of the remainer of thoſe waters which were left upon the earth? For it ſeems that it was ſtill covered with waters.*

*A.* *Upon the third day of the creation, God gathered together thoſe waters into one place, which is the Sea; and then the earth appeared. * Gen. 1. 9,10.

Qu. *What then ſucceeded?*

*A.* Then the Sea and the Earth together made this Globe, * which is the habitation of all mankinde. * Iſai. 45. 18.

Qu. *Is not the earth compaſſed about with the Sea?*

*A.* Yea, and it hath left in it many places uncovered; ſo that the deep and

hollow places of the Globe of the
*Iſa.40.22 earth are replenished with the Sea,
* which makes it ſo round as it is.

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## Chap. III.

### *Of the Sea, its ebbing and flowing.*

Qu. W*Hat is the Sea?*

* Pſal.104. 25. A. * It is the great treaſure of waters, wherein are ſeveral
* Eccles 1.7. multitudes of fiſhes, and * from whence the Divine providence draws an infinite number of Rivers and Streams,
* Pſal.104. 10. which run upon the face of the earth *, croſſing the Springs thereof.

Qu: *Thoſe rivers that are drawn from the Sea, do they not return thither again?*

* Eccles 1.7. A. * Yea, the Sea is the receptacle of them all, and is likewiſe the ſtorehouſe of waters, not onely to furniſh all parts of the earth, but alſo the proper ſubject from whence the Sun draws the moiſt vapours into the middle Region of the air, and doth there form
* Pſal.104. 13,14. divers Meteors, but eſpecially the *rain, whereby the whole world as a garden becomes watered, refreſhed, and made fruitful.

Qu. *If the Sea be the ſtore-houſe of*
*ters to ſupply the earth, which the ſun*
*aws from thence into the air into clouds,*
*d ſo watereth the ſame, (as you alleadge)*
*e which hath continued ever ſince*
*oah's flood to this preſent; and yet the*
*a never a jot the emptier, though ſo ma-*
*thouſand yeers ſince; How comes this*
*paß, and from whence hath the Sea its*
*pply?*

*A.* The Anſwer to this, depends
pon this conſideration, That all things
the world are continued, not by new
reations, or ſupplies *de novo*, as from
me other place; but by ſucceſſive mu-
tions or alterations: ſo as that what
to day in one form, becomes to mor-
w in another, and next day in a third;
aſmuch as what is now water in the
ea, by the Suns attraction riſes in a
apour, then thickens in the Middle
egion, ſo falls upon the earth: and
eſides, what is retained for mutation
f Minerals, Vegetables, and Animals,
s perculated or ſtrained thorow the
pungie body of the earth, and flows
horow its numerous caverns into the
ea again; by reaſon whereof, there is
continual ſupply for generation, with-
ut any other then a preſent, and that

inſenſible deprivation of the Seas fru neſs.

Qu. *What is the cauſe of the flowi and ebbing of the Sea?*

*A.* The flowing and ebbing of th Sea, is ſometimes ſlowe and gentle, an ſometimes ſwift and violent, accordin to the nature and quality of the *Moo which is to be diſtinguiſhed by the ſe veral ſeaſons of the year: and God ha ſo appointed it, for the purging, clean ſing, and preſerving of the ſame. Fo the Sea is a nurſe of ill vapours, an would otherwiſe be a ſink of ſtinkin ſtuff; which are ſcummed and cleanſe by the Tyde and Windes.

* Pſal. 104. 19.

Qu. *The uſual flowing and ebbing the Sea appears twice a day in theſe part of the world; but in ſome other parts ther are many Tydes in a natural day. An whereas in ſome places the Sea uſually flow gently up the Rivers, yet it happens in ſom other places the Tyde flows in a violen maner, and is high-tyde in a little time after. What is the reaſon thereof?*

*A.* To give exact reaſons of the various ebbs and flows of the Sea, where they keep order in their circuits, and where not, would require a Diſcourſe, and that a large one, by it ſelf: a matter

hich the limits of this Treatiſe will
t admit of. But in ſhort, thus: Ex-
rience makes it good, that the ebbs
d flows depend upon the motions
d poſitions of the Planets, eſpecially
the Sun and Moon. That it is ſo
*facto*, is evident,

1. Becauſe the Tydes riſe, as the
oon aſcends the Meridian; and de-
ine, as ſhe deſcends from that height,
d that in both Horizons.

2. Becauſe the ebbs and flows keep
ot daily the ſame hour, but vary accor-
ng to her mutations.

3. The Tydes are equal, where the
ys and the nights are equally divided
nder the Equinoxial, and nowhere
ſe.

4. It appears from the difference of
ydes according to the different chan-
es of the Moon. At her firſt change,
e Tydes are ſmall, to the firſt quarter;
nd ſo increaſe, as ſhe grows bigger; de-
reaſing as ſhe wanes.

5. To this may be added, that in the
ain Ocean the Tydes ſwell and over-
pread more then in ſmaller Seas, Arms,
r Crooks; becauſe there ſhe feeleth
ore effectually the force of the Planet
eing at liberty, then when ſhe is pent

up into narrow bounds, which is th cauſe of the different ebbes and flow in ſeveral places in the main Sea,and i lakes and little rivers. And this ſha ſuffice to have ſpoken of this matter.

Qu. *When doth the Sea purge mo of all?*

*A.* When the Moon is at the Chang or Full: for then the Sea purges, as th waters of a great Cauldron or Kettl over the fire. When it riſeth up to th top, it caſteth out the ſcum, until ther be none left in: and to this purpoſ ſerve the ordinary and extraordinar Windes, which are (as it were) th ſpoons and ſcummers of the Creator, to purge and cleanſe more and more th Sea, that great Cauldron of waters, which are ſo many ways ſerviceable, both to the earth, and to thoſe that live therein.

Qu. *What may the depth of the Sea be?*

*A.* The Sea in ſome places is above an hundred fathom deep, and in other ſome places there is no bottom to be found, as ſome by experience have diſcovered, by letting down a Line with a Weight at the end thereof, many hundred fathoms in length, yet ſtill there was more Line required ; and when upplied, yet no bottom found: and yet the Sea in no place is bottomeſs.

Qu. *How comes this to paſs?*

*A.* Of this there can be but two eaſons given:

1. Either Line was wanting, ſo that lthough it hath been tried with a Line of a vaſt length, yet it hath wanted of that exceeding deep profundity ſo immenſe a body is capable of: Or elſe,

2. Becauſe of ſome Torrents of water *in profundo maris*, in the depth of the Sea, the Line and Plummet, which then cannot be of any great weight, is carried away by the rapid motion of the waters, and become thereby uncapable of ſounding the bottom.

Qu. *What obſervation ariſeth from this Diſcourſe of the Sea?*

*A.* The principal thing conſiderable herein, is * the power of the Creator, which all men ought to magnifie and admire.

*Pſal.107. 24,25,26.

Chap.

## Chap. IV.

### *Of the Terreſtrial Globe, our Antipodes, and whether the Ear move or not.*

Qu. *WHat is the diameter of the Te reſtrial Globe?*

*A.* 6 thouſand 782 miles $\frac{1}{11}$.

Qu. *What is then the circumferen thereof?*

*A.* 21 thouſand 600 miles : th whole conſiſting of 360 degrees, 60 miles to a degree.

Qu. *In what time may a man (havi no lett) go round about the ſame, after 1 miles a day?*

*A.* In 3 years, nine months, and days, he may compaſs the ſame.

Qu. *Where is the Terreſtrial Glob placed?*

*A.* It is placed in the middle of th Axletree of the world, and makes th Centre (that is to ſay, the prick, o point) of the world, or of the heavens which turn about it, and are the Circumference thereof.

Qu. *How is this ponderous Globe ſupported?*

*A.** It hangs in the air upon nothing, etween the heavens, and is upheld by he onely will and almighty power of s Creator.

*Job 26. 7.

Qu. *That thing or ſubſtance (which is alled the earth) that hangs, we ſuppoſe ath ſomething to hang upon; but it ſeems he earth is ſaid to hang upon nothing: how this naturally to be underſtood?*

*A.* It hangs by the providence of God upon its own weight, and is as a ery Point to the immenſe Circumference of the heavens,which equally on ll parts thereof is a like diſtance from he earth.

The difficulty in underſtanding thereof, is that incomprehenſible myſtery of he Centre, which hath its foundation ithin it ſelf; all parts of the Circumference inclining with a natural tendencie to the middle point, which is called the Centre. In a Spherical body, it would be very improper for any part of the Circumference to be the Baſis or foundation to the reſt; and herefore it was requiſite it ſhould have uch a Baſis as to which all Points in the Circumference ſhould be alike inclined, and from which they ſhould be equidiſtant, and that is that which is the Centre.

*Qu. Our Antipodes, whoſe feet a oppoſite to ours, ſeem to us to walk w their heads downward, as we in like man ſeem ſo to them; and yet all the inhab tants of the earth walk thereon alike, a the earth to our ſeeming were flat like trencher, and not round like a ball. Wh natural reaſon may be given, for the ſat faction of our mindes of this wonderf work of God?*

*A.* The whole Earth and Sea mak together a perfect round Globous f gure, (as aforeſaid) and is encompaſſe by the heavens; ſo that let a man b on what part of the ſurface thereof h will, yet the heavens are above him.

Thoſe that are oppoſite to us, ar therefore properly called Antipodic to us, are not under us, but againſt u above and belowe; being in this Sphe rical body to be underſtood, not of di ferent Points of the Circumferenc one to another, but of any of them t the Centre: and therefore it is, that i all parts of the earth, creatures are ſai to be *above* it, or *upon* it.

That the earth and water make on Globous body, is evident by the Eclipſ of the Moon. For every body gives ſhadow like unto its own form: ſinc

there

therefore the ſhadow in the Eclipſe is round, the body that makes it muſt needs be ſo.

Qu. *Doth the earth at any time move?*

*A.* * No; it abides firm and ſtable, for the good and for the ſupport of the inhabitants thereof. * Pſal.93.1 and 104.5.

Qu. *Some are of opinion that the earth moveth; which is contrary to that which in ſeveral places of the Scripture is affirmed: What are the moſt pregnant reaſons to prove the contrary?*

*A.* The earth, as to it ſelf, in the whole frame thereof, is immoveable in its locality; and this may be proved by many demonſtrations and reaſons: but one ſhall ſerve for all.

It muſt either firſt move in a direct or right motion, up or down, or ſideways: or ſecondly, in a circular motion, from the Eaſt to the Weſt, from the North to South; or on the contrary: or thirdly, from theſe motions it muſt have a mixt motion.

Theſe are the 3 motions local which are acknowledged by the Ancients and ſoundeſt Philoſophers to be all the kindes of regular motion. Other motions there are not, that are regular.

Now of thoſe that affirm that the

earth moves, there are none who ſay the earth moves in a direct line, or in a mixt motion; but onely in that motion which is circular.

But that it doth not move in a circular motion, I thus prove.

If there be a circular motion of the earth, the motion muſt be 360 degrees, which is

| | | |
|---|---|---|
| 21600 | miles | in 24 hours. |
| 900 | | in one hour. |
| 15 | | in a minute of an (hour. |

Now ſuppoſe a man ſhooteth an Arrow upright in the air, it muſt have ſome time to fall down again to the earth: in the mean while, the man moves with the earth, (if the earth move at all;) ſo that the Arrow muſt needs fall ſome diſtance from the man: if it be but half a minute of an hour, the Arrow will be 7 miles ½ diſtant from the man. Then which, nothing is more contrary to every mans experience.

It is therefore very abſurd to conceive any ſuch motion of the earth. For what Artifice humane can be made to move in any motion 15 miles in a minute of time? And if the motion of that Artifice ſhould be the Arrow ſhot out of the ſtrongeſt bowe, or bullet out of a Piece, and be ſhot perpendicular, and imagine it to go 15 miles in a minute upright, (which it is impoſſible to do) yet in the deſcent it would be longer in time coming down, moving then onely by its own weight, and not the impulſion of the Engine or Artifice: In the mean time, the earth muſt be ſuppoſed not to have moved any jot in any maner of wiſe, much leſs 15 miles from the centre of the Arrow or Bullet, or elſe the party that ſhot it muſt be ſo far off from the Arrow, he being upon the earth, and (if it moves) neceſſarily carried away by its rapid motion. A matter wholly contrary to Senſe.

Many other reaſons might be alleadged, to prove that the earth is immoveable: but this being demonſtrative, will I ſuppoſe ſatisfie.

Qu. *What is further to be conſidered of the earth?*

*A.* * It is the Lords footſtool, *which he hath given to the children of men: wherefore although it be but a little ſpot in compariſon of the heavens, yet is it the onely true Spouſe of the firmament of heaven, which yeelds an infinite increaſe of good things, by reaſon

* Iſai.66.1.
* Pſal.115. 16.

of the participation they have together:
And notwithſtanding the vaſt diſtance
betwixt the heavens and the earth, yet
is there ſuch a ſympathy & mutual love
between them, as ſerves for the good
of man, and the glory of the Creator.

* Iſa.44.23 * It is the loweſt of all the elements,
* Prov.27. 3. black and * ponderous, invironed and
incloſed with the other three elements,
*viz.* Water, Air, Fire.

*Gen.1.12 She is called the mother of * fruits,
* Chap.2.5 * the productreſs of all plants, * the
*Eccles 5.9 nouriſher of all living creatures, the
* Ezek.36. 10. foundation of all * buildings, * the ſe-
pulchre of the dead, the Centre of the
* Joh.5.28 beautiful frame of the celeſtial Globe,
*Gen.3.19 * the matter and ſubſtance of mans bo-
* Job 38. 31,32,33. dy, the receptacle of * heavenly in-
fluences.

* Matth.6. 28,29,30. * She is garniſhed with fragrant flow-
ers, *&c.* and of man, beaſt, and fowl
inhabited.

She is likewiſe comfortably quick-
ned by the nouriſhing beams of the Sun,
Moon, Planets, and fixed Stars, to the
general comfort & contentment of all.

* Deut.5 8 Qu. *It is ſaid that * the waters are be-*
* Pſal.24.2 *neath the earth, * that God hath founded it*
*Pſa.136.6 *upon the ſea, * that the earth is above the*
*waters. How then can you make good*
*the*

*that the earth is the loweſt of all the elements?*

*A.* When the waters are ſaid to be beneath the earth, as in the ſeveral places cited, it is not to be underſtood of the whole earth, but of ſome part thereof, belowe which there are waters; as we ſee, in the digging deep into the earth, there will appear a forcible emanation of waters. The Sea alſo is belowe his banks or bounds; but yet not ſo, but that both the Springs and the Sea have the ſtabilement of earth beneath them: for the one may be drawn dry, or at leaſt, its ſupply is not from a continued profundity of waters, but from a ſoaking thorow the ſpungie body of the earth out of the Sea. The Sea alſo, we know, may be fathomed.

Allowing therefore that there are waters under ſome part of the earth, it notwithſtanding remains true, that the lowermoſt, or rather, the innermoſt of this Globous part of the body, muſt be earth, as being the moſt ſolid and ſtable, and ſo more agreeable to the nature of a foundation.

Beſides, we finde in the work of the Creation, that the earth appeared not until the waters were gathered: and the gathering of the waters implies not a putting them under the earth, but a diſpoſing of them together in ſome part of the earth.

Adde to this an Argument taken from the diameter of the earth, which is allowed to be above 67 hundred miles. And though the Sea, as to its ſurface or ſuperficies,is as much in ſpace or place as the ſurface of the earth, yet, as to its depth,it bears no compariſon; the Sea being in very few places (as is before alleadged) above 100 fathom, which is not $\frac{1}{5}$ part of a mile, which holds, I ſay, no proportion with 67 hundred miles: Therefore, as to profundity, the waters muſt yeeld to the earth.

In all which, appears Gods wonderful power and wiſdom, in placing and ordering this earthly Globe, (the Centre of the heavens) in ſuch a ſtrange and excellent maner, as diſcovers the goodneſs and providence of the Creator of it, in his continual preſervation thereof in its variety of his bleſſings, as is before ſpecified.

Qu. *If the footſtool of the Lord here belowe, yeeld ſuch an increaſe of good things, to the comfort, contentment, and* *delight of the inhabitants thereof ; What may we think of his Throne above ! what pleaſures are there reſerved for thoſe that love and delight in him !*

*A.* The pleaſures and delights of this world (comparatively to thoſe that are above) * are but very few, of ſmall durance, and very uncertain. * The joys above are infinite, and eternal, which every faithful ſoul ſhall have full aſſurance of; as by the enſuing diſcourſe (in its due place) appeareth.

* Eccles 2. 1.
*Pſa.16.11

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## Chap. V.

### *Of the three Regions, their nature : of Meteors and Apparitions.*

WHat is the next thing in this deſcription, we are to conſider of?*

*A.* That ſpace which is between the earth and the firſt heaven, or Circle of the Moon. All which ſpace, to the ſuperficial part of the Globe of the earth, and of the ſea, is divided into three Stages or Regions, *viz.*

1. That next the earth, is called The lower Region.

2. That next to that, The middle Region

3. The other above that, The higher Region.

In every one of which are formed divers Meteors of the quality of the Region where they are formed.

Qu. *What is the nature of the lower Region?*

*A.* That Region being neer the earth, is ſometimes hot, and ſometimes cold. For there the Summer and Winter is felt and known to be, according to the courſe of the Sun, as it approacheth neerer to our Zenith or Vertical point, or goeth back from it.

Qu. *How comes this Region to be hot?*

*A.* By the reflex of the Sun, whoſe beams firſt ſtriking the earth, do rebound back again to that Region, eſpecially when his beams in the Summer-time are perpendicular, or the neerer they incline thereunto, and in the Meridional or Southern Climates.

Qu. *How comes this Region to be cold?*

*A.* In Winter, in the Northern parts it is very cold, becauſe the Sun doth caſt his beams obliquely, or ſideways.

Note alſo, that it changeth in divers places according to the ſeaſons, r according to the reflexion of the Sun-beams.

Qu. *What is bred in this Region?*

*A.* The * Clouds, Dews, Rain, * the Rain-bowe, and ſuch-like.

Qu. *What is the nature of the middle Region?*

*A.* It is cold. For the air being naturally hot and moiſt, this humidity is evermore forced back by the cold exhalations which are drawn up from the earth, eſpecially when the Sun-beams, being ſo far off, cannot warm the earth. So that this Region is the receptacle of Cold, which is there ſtrengthened, by reaſon of the cohibition and compreſſion, or encounter between the other two Regions, which are contrary to that. For the higher Region is always hot, and ſo (in Summer) is the lower Region in like maner: by reaſon whereof, when the cold exhalations are drawn up into this middle Region, and there ſhut up, and reſtrained perforce by the contrary qualities which incloſeth them, they muſt of neceſſity be cold, being ſo reſtrained and incloſed round about, they can neither go backward nor forward.

Qu. *What*

* Job 36. 28.

*Gen.9.13

Qu. *What is ingendered in this Region*

*Pſa.148.8 *A.* * Storms, Tempeſts, * Thunde
*Job 38.25 * Snow,Hail, Froſt, and Darkneſs. Am
* Pſal.147.16. in ſome parts of it, there is a plac
* Eph.2.2. and 6.2. where * the Prince of the air,and othe
evil ſpirits, have their reſidence at ce
tain times, where they do terrib
things in a fearful maner, when
pleaſeth God to let looſe the brid
unto them.

Qu. *What is the high and upper Regi*
*of the air ?*

*A.* This Region is next unto th
Celeſtial Circles, and is called by th
name of *Fire :* not that there is fire i
that Region, but in regard of the conti
nual motion, and by the beams of f
many celeſtial bodies, the air is heate
and comes ſo neer unto the quality an
nature of the Fire, as hath obtaine
that denomination.

Qu. *What then is the elemental fire ?*

*A.* It is nothing but an air moſt pure
moſt ſubtil and thin ; which is mad
hot by the motion of the celeſtial fires
which are ſo neer unto it.

Q. *What is bred in this Region ?*

* Luke 17.24. *A.* * Lightnings, Fire-drakes, Co
mets, Blazing Stars, and ſuch-like.

Q. *What may the diſtance of theſ*

thre

*three Regions be from the earth?*

*A.* To know exactly their diſtance from the earth, or from one another, is not to be attempted, becauſe thoſe diſtances are not always the ſame, but different in ſeveral ſeaſons, and deviſed onely for better underſtanding, and diſtinguiſhing thoſe things that are peculiar to each Region.

The upper Region is above the top of the higheſt mountain, and contains all that ſpace to the element of Fire. This is always clear and ſerene, void of Clouds, Rain, Thunder, *&c.*

The other two belowe this, are not always of an equal magnitude. For the lower, whoſe termination is the utmoſt extent of the reflexion of the Sun, is greater in Summer, becauſe then the reflexion from the earth is ſtronger and higher, and conſequently the middle Region is then leſſer. On the other hand, in Winter the lower Region is ſmaller, & the middle Region larger, becauſe then the reflexion from the earth is weaker and lower.

Again, the middle Region, in reſpect of the other two, is leſs hot, called therefore commonly *The cold Region*, becauſe the heat from above does not ſo ſtrongly penetrate thither, neither yet is it warm'd by reflexion from belowe, as is before declared.

Qu. *The Meteors that are formed in theſe three Regions, how are they divided?*

*A.* They are divided after three maner of ways: *viz.*

1. Into bodies perfectly and imperfectly mixt.

2. Into moiſt impreſſions, and dry.

3. Into Firy, Airy, Watery, and Earthy.

Q. *What is the matter and ſubſtance whereof the moſt part of the Meteors do conſiſt?*

*A.* It is either

1. Water, out of which proceed vapours: or
2. Earth, out of which come exhalations.

Qu. *What are ingendered by thoſe vapours?*

*A.* Thoſe vapours being drawn up from the waters, and watery places, by the heat of the Sun, into the middle Region of the air, and there, after divers meetings with coldneſs, many kindes of Meteors are ingendered; as Clouds, *Rain, *Snow, Hail, &c.

*Job 36.27
*Pſal.147.16.

Qu. *By way of digreſſion, let me ask you what diſtance the clouds are from the earth?*

*A.* There are ſome clouds diſtant from us leſs then a quarter of a mile, ſome half a mile, ſome 3 miles, ſome 9 miles; and ſome again ſometimes 10, 20, 30, 40 miles; and the higheſt clouds of all are 50 miles above the earth.

Qu. *What is the difference between thoſe clouds that are neereſt, and thoſe that are fartheſt off from the earth?*

*A.* That clouds are ſome higher then others, is a matter clear to ſenſe: yea, it hath been ſeen, that clouds above one another have moved ſeveral ways. The clouds are different, according to the diverſity of the matter of which they are made, and the power of the Sun in attraction according to ſeveral ſeaſons.

There are tops of mountains that are above clouds, as hath been witneſſed by ſuch as having been upon them, have found the air clear and ſerene, without winde, when belowe it hath been cloudy, rainy, and turbulent.

Qu. *What impreſſions proceed from the exhalations?*

*A.* Exhalations being thinner and lighter then vapours, paſs the loweſt and middle Regions of the air, and are carried up even to the higheſt Region, where, by reaſon of the exceſſive heat of the fire, they are kindled, and cauſe many kindes of ſhapes and impreſſions.

They are alſo ſometimes clammy; by reaſon whereof, they cleaving together, and not being diſperſed, are after divers ſorts ſet on fire, and appear ſometimes like Dragons, Goats, Candles, Spears, *&c.*

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## Chap. VI.

### *Of the Elemental part of the world.*

Qu. W*Hat is the elemental part of the world?*

*A.* It contains the four elements, *viz.*

1. The *Earth*, } Both which make one
2. The *Water:* } entire ſpherical body.

3. The *Air*, which inironeth the Earth and the Water, (which is divided into the three Regions before ſpecified:) which Air filleth all places upon

ſudden ; ſo that in the matter of ings, there is nothing empty.

4. The *Fire*, which is placed next to e Sphere of the Moon, under the hich it is turned about.

Qu. *What are thoſe Elements ?*

*A.* They are of themſelves pure ſubances, and the firſt and next beginings, whereof all mixt bodies are ompounded, and therefore not to be een with our outward eyes. For as e our ſelves are bodies ; ſo without ur outward ſenſes we can diſcern nohing but that which is compounded : nd therefore the Fire, Air, Water,and Earth, which we daily feel or ſee, are ot the Elements themſelves,but things ompounded of them.

Qu. *You ſay the four Elements are Earth, Water, Air, and Fire, which we ay ſee and feel ; and yet you affirm that hoſe Elements are compounded of the Elements which we ſee not. How is this to be underſtood ?*

*A.* The Elements with us are not pure, however they appear to be ſo ; but each of them hath ſome mixture more or leſs of the other : and that appears, becauſe from any of them extraction and ſeparation may be made;

which elementary bodies, purely ſuch, and void of all mixture, are not capable of.

Qu. *What is further to be conſidered of theſe four elements?*

*A.* Their agreement and diſagreement the one with the other: which conjunctive contrariety, cauſeth divers and marvelous works in Nature, and is (by reaſon of their proper and fit mixtures) agreeable to their ſeveral natures and qualities.

Qu. *Why are there but juſt four elements?*

*A.* There are juſt ſo many as there are combinations and mixture of the ſimple and firſt qualities; which can be but four.

Qu. *How are they diſtinguiſhed?*

*A.* Thus: *viz.*

1. The *Earth* is cold and dry.
2. The *Water* is moiſt and cold.
3. The *Air* is hot and moiſt.
4. The *Fire* is hot and dry.

In all which, God's ſingular providence ſhines, who by his wiſdom hath ordered, and (as it were) wrapped and bound up the elements together, having placed the Earth in the Centre, the Waters round about, then the Air, and

nd then the Fire ; which fire is not
mply above them, but (as it were)
nfuſed among the other three: which
iſtinction of the Elements, hinders
ot at all their fit and proper mixtures
n the compoſition of all things that are
uder the cope of heaven.

Qu. *What effects do naturally ariſe*
*rom the aforeſaid impreſſions?* &c.

*A.* 1. They occaſion * manifold pro- * Eccl.5.9.
ts to Gods creatures. * Jam.5.7.
2. * They make the earth fruitful. * Job 37.
3. * They purge and cleanſe the air. 21,22.
4. * They ſet forth Gods power, * Pſa.29.4
5. * They threaten his vengeance. * Exo.9.25
6. * They puniſh the world. * Pſal. 18. 13,14.
7. * They move to repentance. * Jonah 1. 9,16.

Q. *What then is the univerſal, chief,*
*nd laſt end of theſe and all other things*
*we have hitherto diſcourſed of) in that*
*pace between the earth and the firſt hea-*
*ven?*

*A.* Gods ſingular providence over
ll his works here belowe, * which * Iſa.42.12
re all referred to one end of his eter-
al glory.

## Chap. VII.

### *Of the Planets in general.*

Qu. I *Shall now deſire to know, firſ what may be obſerved concernin the Planets in general?*

*A.* The celeſtial bodies are divided i to two bands or parts:the one are *fixe ſtars*;the other are called *Planets*,(that to ſay) Straglers,or Wanderers;& tho are in number ſeven, to wit, the *Moo Mercury*,*Venus*,the *Sun*,*Mars*,*Jupiter*, *Saturn.* Which Planets are containe within that great and large ſpace whic is between the eighth heaven of th fixed ſtars,and the earth ; and have eac Planet its circle or heaven : for othe wiſe they ſhould continually keep th place, as the fixed Stars do.

Qu. *What motion have theſe Planets?*

*A.* They have their ſeveral motions diſtinguiſhed the one from the other as thus : The Moon hath her courſe a part, which ſhe finiſheth in a month *Mercury*,*Venus*,and the *Sun*, in a year *Mars*, in two yeers; *Jupiter*, in twelv yeers, and *Saturn* in thirty yeers.

This daily continual motion of the Planets is carried about by the *Primum mobile*, or firſt Moveable; and yet have their particular and ſeveral motions; which are not at all contrary, conſidering they are made and turned upon divers Poles upon which the heavens move, being many degrees diſtant the one from the other.

Qu. *How is this made clear to the underſtanding?*

*A.* By a proper Simile. Let us ſuppoſe a large Wheel which may be moved and turned about from eaſt to weſt every 24 hours. Let ſeveral flyes or other creeping creatures move contrariwiſe upon the ſame Wheel from weſt to eaſt, ſome ſlower, ſome ſwifter, from ſome certain point or mark: and imagine that ſome one of them may be a month in moving round, another or more of them a yeer, another two, another 12, another 30 years, before they can attain to the point from whence they began their motion; yet ſuppoſing the great Wheel to move round every 24 hours from eaſt to weſt, and the other creeping creatures continually move from weſt to eaſt.

Qu. *What form have theſe Planets?*

*A.* They are all (as the fixed ſtars are)orbicular, or perfectly round.

Qu. *If it be true that the Planets and other celeſtial bodies be perfectly round, as you alleadge, How comes it to paſs that ſome Aſtronomers, by their Aſtrolobes, Optick Glaſſes, and Mathematical Inſtruments, finde ſome of them oval, ſome like the half Moon, ſome forked, ſome pointed, ſome in a maner ſquare, and ſuch-like various ſhapes, which to the eye (thorow thoſe Inſtruments) do ſee appear?*

*A.* They ſo appear, from the divers and ſundry Aſpects which the Sun caſts upon them, he being the light of the world: yet the Stars, the Planets, as alſo the Sun it ſelf, through vapours neer the Horizon, may appear eliptical, or of an oval figure,and other figures, and yet really is perfectly Globous, and exactly round, as being the compleateſt Figure; ſo alſo is the Moon, all the reſt of the Stars: yea, and the earth and the Sea together make but one Globe, notwithſtanding the high hills and deep valleys in the earth, and the aſcending and deſcending of the Sea.

Qu. *What time then do the Aſtronomers obſerve by their Inſtruments, to finde* *out the true figure or ſhapes of the celeſtial bodies?*

*A.* They appear moſt globous and round, when the air is cleareſt, and they in greateſt diſtance from the Sun; as is eaſily demonſtrable in the Moon, when ſhe oppoſeth the Sun, and is then commonly called The Full Moon, which is her true figure.

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## Chap. VIII.

## *Of the Moon.*

Qu. *I Shall now in the ſecond place deſire to know how the Planets are particularly deſcribed. And firſt, what Planet that is which is next above the earth?*

*A.* The Moon; which is the ſeventh Planet.

Qu. *What form and light hath ſhe?*

*A.* Her form is round (as aforeſaid) and her light is borrowed from the Sun. For as a Looking-glaſs well poliſhed, tranſports or caſts the light of the fire, or of the Sun againſt a wall or plank; ſo doth the Moon receive and retain the light of the Sun, and in a fair and clear night cauſeth that light to reflect againſt the earth.

Qu. *Is it not ſaid in the firſt chapter of* Geneſis, *that *God made two great lights, the greater light to rule the day, and the leſſer light to rule the night? which two lights are the Sun and the Moon. Now although the Moon be the leſſer light, yet it ſeems from hence that ſhe is a perfect light in her ſelf, though not ſeen when ſhe is neer the Sun, by reaſon of his far more glorious great luſtre. How then can you maintain, that the Moon borrows her light from the Sun?*

*Gen.1.14

*A.* In anſwer to this, be pleaſed to conſider, firſt, that the Scripture, although it ſpeaks of two Lights, yet it does not expreſs them both to be eſſentially and inherently ſo: Sufficient therefore it is, that they are both Lights, though one of them be by reflexion from the other. That alſo which is ſo by reflexion, is really and truely light; as water is truely and ſenſibly hot, when made ſo by the fire. And ſo much to the text of the Scripture.

But further to make it appear that the Moon has its light by reflexion from the Sun, take two arguments which will leave the matter true, even to ſenſe.

The firſt is from the ſeveral Aſpects of the Moon in her variations.

The ſecond, from her Eclipſes.

Firſt, from the ſeveral Aſpects of the Moon, it appears that her light is ſo borrowed, becauſe ſhe is enlightned onely on that part of the Globe which has its aſpect towards the Sun, or upon which the Sun has its aſpect: ſo in the firſt quarter, the Sun being new ſet in the weſt, that part of the Moon is enlightned which is towards the weſt; and though it be the full half of her Globe, yet is there to us onely a ſmall part of her light viſible, *viz.* that illuminated ſemi-circle, or her horns, as they are vulgarly called; which more and more increaſe, as they both grow into a direct oppoſition: and when they are diametrically oppoſite, then doth that half of her that is enlightned fully appear to us; which we call her being in the Full: from which time, (the Moon paſſing her circuit more ſlowly then the Sun) his reflexion upon her is from the eaſt, the eaſtern ſide of her globe being then onely enlightned.

And thus we ſee, that the light of the Moon is more or leſs to us-ward, according as her poſiture is towards the

Sun. The other parts of her that receive not the reflexion, being, if not dark, yet without any conſiderable illumination.

Which the ſecond argument from the Eclipſe doth ſomewhat more clearly prove, becauſe it ſhews the Moon to be a dark body, when ſhe is in ſuch a line of oppoſition to the Sun, as that the earth (being an opacous or groſs body) interpoſing, ſhe cannot receive her reflexion from the Sun: which is yet further manifeſt, by the beginning and end of Eclipſes, as ſhe gradually loſes and gains her light, until they both removing into a line of oppoſition, where there is no ſuch interpoſure, ſhe becoms again wholly enlightned.

Safely therefore may we conclude, that though they are both great and glorious lights, and that the Sun is ſo eſſentially; yet that the Moon is ſo onely by mutuation or reflexion from the Sun.

Qu. *What elſe is to be conſidered of the Moon?*

*Pſal.104. 19. *A.* Firſt, * her ſweet temper, which doth ſo qualifie the extreme heat of the Sun, that the elemental world is thereby preſerved, and ſubſiſteth:

iſteth: to which purpoſe, this Lunary body runs thorow the Zodiack thirteen times in a yeer, and doth commodiouſly move or meet in Signes or places of heaven fit and proper, in imitation of the Sun: ſo that in Winter ſhe (as it were) chuſeth the ſignes of the Summer, and in Summer the ſignes of the Winter, whereby the extremities of thoſe qualities are moderated; and caſts back the ſun-beams here below upon the earth, with an admirable temperature.

Secondly, in regard ſhe changeth every month, ſhe is called the true Kalender (in her Changes, Increaſe, Full, and Decreaſe) of Feſtival days.

Thirdly, * ſhe is ordained to be the miſtreſs and governeſs of the night. *Gen.1.16 Pſal.136. 19.

Fourthly, ſhe is ſurnamed the Princeſs of the Sea; upon the ebbing and flowing whereof, ſhe hath a marvelous power: for if ſhe decline, or be in the firſt quarter, then the Tyde is weak; but when ſhe changes, or is at the full, then is the Tyde violent & ſtrong: upon which occaſion it is, that this Planet (which rules over the humidity and moiſture) cauſeth the maſs or heap of waters in the Sea ſo to ſwell and increaſe, and carries them to and fro, according as ſhe is her ſelf in the eaſt, or as ſhe bends downward in the weſt.

Fifthly, ſhe hath a marvelous power over all kinde of Animals and living creatures.

Qu. *What is the cauſe of the Eclipſe of the Moon?*

The Eclipſe of the Moon is occaſioned by the encounter of the ſhadow of the earth, which is in oppoſition between the Sun and the Moon when ſhe is at the full; and then the Sun and the Moon are right over againſt one another in two oppoſite points, which are called the Head and the Tayl of the Dragon, under the Ecliptick Line; the earth being between both, darkneth and depriveth us of light, inſomuch that we cannot ſee the Moon lightned with the Sun-beams. When the Moon is found in one of theſe two points, then ſhe is wholly defective, and in the full Eclipſe: and if ſhe be neer to either of theſe two points, ſhe is darkned more or leſs, according as ſhe is neer unto us, or unto the Ecliptick Line.

Qu. *May the Eclipſe of the Moon be univerſal?*

*A.* Yea, it may be univerſal; and

the reaſon is, becauſe the earth is far bigger then the Moon, and thereby able to ſhadow her whole body, for that ſhe will not ſuffer the Moon to receive any light from the Sun, from whom ſhe always borroweth her light.

Qu. *What is the diſtance of the Moon from the earth?*

*A.* 160 thouſand 426 miles.

Qu. *How big is the Moon?*

*A.* She is 40 times leſs then the earth.

Qu. *What is her diameter, or thickneſs?*

*A.* 1 thouſand 828 miles.

Qu. *What is the circumference of her circle or heaven?*

*A.* 962 thouſand 556 miles.

Qu. *Very much and many things are hitherto affirmed touching the ſpace between the earth and the heavens, and concerning the Planets, ſeveral Circles, and now of the exact diſtance of the Moon from the earth to be 160 thouſand 426 miles; and ſo of her bigneſs, thickneſs, and circumference of her circle or heaven. But ſince meer affirmations, or the opinions of Authors, are not ſufficient proofs, it will be of greateſt ſatisfaction, and moſt uſeful throughout this Diſcourſe and Deſcription* *of the heavenly bodies, to expreſs in this place briefly what are thoſe grounds upon which the Aſtronomers do come to know that thoſe Concluſions they draw are true, that ſo theſe Arithmetical Calculations may appear to be real truths, and not meer affirmations. Pray therefore what are thoſe grounds?*

*A.* The diſtance from the earth, the magnitude, thickneſs, and circumference of the Moon, is Aſtronomically to be computed, and inſtrumentally obſerved: her Parallax is chiefly conſidered; her Perigeiety, Apogeiety, and Eccentricity; with many Aſtronomical Obſervations.

And if the diſtance, magnitude, circumference, *&c.* of her, the Sun, and the earth, were not known, or could not be found out, it were impoſſible to finde out the time, quantity, and continuance, *&c.* of the Eclipſes either of her, or of the Sun.

But the time, quantity, continuance, *&c.* of Eclipſes is certainly known.

Therefore, the diſtance, magnitude, circumference, *&c.* is likewiſe known.

Chap.

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# Chap. IX.

## *Of* Mercury.

Qu. *WHat Planet is next above the Moon?*

*A. Mercury*; which is the ſixth Planet.

Qu. *What is conſiderable in this Planet?*

*A.* This Planet is but a little ſeen with us, by reaſon of the thick vapours and fogs with the which the air is overcaſt; which is a main obſtacle, and hindereth much the line of our aim and level with the Horizon: and in regard of his ſtay and abode neer unto the Sun (whoſe great luſtre and brightneſs defaceth and putteth out as it were all other lights that approach neer unto it) it declines or falls from beyond the Ecliptick Line againſt the Meridional part toward which it doth ordinarily bend, leaving the Planet *Venus* always on the north-ſide.

This Planet continnally waiteth upon the Sun, and followeth him as a ſervant followeth his maſter, and is never above 28 degrees from him.

Qu. *How far is this Planet above the Moon?*

*A.* 356 thouſand 102 miles.

Qu. *What is then his diſtance from the earth?*

*A.* 516 thouſand 528 miles.

Qu. *How big is this Planet?*

*A.* 3 thouſand 140 times leſs then the earth.

Qu. *Then it ſeems it is the leaſt of all the Planets, and of all other the celeſtial lights: what therefore may be the diameter of it?*

*A.* As little as it is, yet of it ſelf it is a great light, inſomuch that if it were neer us, it would cover a greater continent of land then *England* is: for the diameter thereof is 430 miles.

Qu. *What is the circumference of its heaven?*

*A.* 3 millions 99 thouſand 168 miles.

Chap.

## Chap. X.
## Of Venus.

Qu. W*Hat Planet is next above* Mercury?

*A. Venus*; which is the fifth Planet.

Qu. *What is obſervable in this Planet?*

*A.* This Planet, with *Mercury*, ſeem o be (as it were) Yeomen of the Guard to the Sun: for they are nothing neer ſo far diſtant, as the other Planets bove him are; but in compariſon of he other Planets, they ſeem to be neer him; eſpecially this Planet *Venus*, which is one celeſtial ſigne and a half, nd ſomewhat more; and *Mercury* a ittle leſs then a ſigne: both which Planets turn continually about the Sun, nd do accompany him in an orderly courſe.

But this Planet being left by *Mercury* on the North-ſide, is ſo great and o bright, that we may diſcern the ſhadow of ones body in the beams thereof: for by her declining, ſhe is removed ſo far off from the Sun, that ſhe cannot be obſcured by the light ther of; and yet notwithſtanding, ſhe do ſo truely and faithfully accompany hi that oftentimes ſhe riſeth in the mo ning before him, and at other times ſh followeth him very cloſe towards th evening: and the reſt of the time ſh is hid from our ſight, by being ſo ne the Sun.

Qu. *How is this Planet otherw called?*

*A.* She is called by ſome, The daii ty effeminate Planet; and by other The Suns handmaid, becauſe ſhe do ſo faithfully accompany him, (as afor ſaid.)

Qu. *How far is this Planet abo* Mercury?

*A.* 315 thouſand 298 miles.

Qu. *What is then her diſtance from th earth?*

*A.* 831 thouſand 826 miles.

Qu. *How big is this Planet?*

*A.* 32 times leſs then the earth.

Qu. *What is her diameter?*

*A.* 1 thouſand 986 miles.

Qu. *What is the circumference of he heaven?*

*A.* 4 millions 990 thouſand 95 miles.

## Chap. XI.

### *Of the Sun.*

Qu. WHat Planet is next above Venus?

*A.* The Sun; which is the fourth Planet.

Qu. *What is obſervable concerning this Planet?*

*A.* This Planet is placed in the middle between the other ſix Planets, having *Mars*, *Jupiter*, and *Saturn*, above him; and *Venus*, *Mercury*, and the Moon, under him. This glorious Planet is the * continual fountain of heat, the ſource or head of bright ſhining light, the life of the univerſe, the eye and torch of the world; the ornament, grace, and beauty of the firmament; the King of the fixed ſtars and Planets, the Prince of the Celeſtial fires, and hotteſt of all the heavenly bodies: the ſervant of God and of Nature, that gives life unto all the creatures, by a ſingular bleſſing and providence of the Creator.

* Pſal. 19. 5, 6.

Qu. *You alleadge that the Sun is the*

*fountain of heat, and that he is the hotteſt of all the heavenly bodies; whereas others affirm there is no heat in the body of the Sun, and therefore is not the ſubject, but the efficient cauſe of heat. For, ſay they, the prime ſubject of heat is the element of Fire, the prime efficient cauſe is the Sun, which can produce heat, though he be not hot himſelf. And the reaſon they give, is, That if the Sun be the ſubject of heat, becauſe he is the original and effector of it, then* Saturn *is the ſubject of cold, the Moon of moiſture, and* Mars *of dryneſs: and ſo we ſhall place action and paſſion, and all the elementary qualities, in the heavens, making a Chaos and confuſion of celeſtial and ſublunary bodies. Again, if the Suns vicinity cauſeth the greateſt heat, why are the tops of the higheſt mountains perpetually cold and ſnowie? Wherefore they conclude, that the Sun is the cauſe of heat, though he be not hot; as he is the cauſe of generation and corruption, though he be neither generable nor corruptible. What anſwer can you give to this?*

*A.* To this Queſtion (being not Mathematical, but Philoſophical) I ſhall give a twofold Anſwer.

Firſt, as to Reaſons Philoſophical.

1, That the Sun, and not the element

of Fire is the original of heat. For if the element of Fire were, all parts of the earths ſuperficies would be equally hot ; the element of Fire being equidiſtant from all parts of the ſurface of the earth : whereas we finde evidently the ſeveral parts of the earthly Globe to be differently hot or cold, according to the approximation or remoteneſs of the Suns body.

2. The giving life, growth, and augmentation, to all animals, vegetables, and minerals, is from the real imparting of actual heat from the Sun : and therefore in the abſence or diſtance of the Sun in the Winter, its defect is ſupplied by the application of that which is actually hot ; to which end, in ſome Noble-men's Gardens in *Germany*, great fires are made, whereby their fruit-trees, *viz.* Peaches, Pomegranates, Lemons, and Figs, are forced in Winter, and produce fruit at the time of the yeer, pleaſant to ſight and taſte ; as thoſe of *Nerbon* in *France*. I ſay therefore, Since that which ſupplies its abſence is actually and ſubjectively hot, it evinces clearly that the Sun is hot, and ſo appears when it is preſent or neer.

3. The cold and ſnow upon the tops of high mountains, is no more an argument againſt the heat of the Sun,then of the element of Fire: the cauſe whereof,is the coldneſs of that Region of the air; which is occaſioned by it's wanting the reflexion of the Sun's heat from the earth, which ſuch parts of the air as are neer to the body of the earth do enjoy.

4. The Sun is no otherwiſe the cauſe of generation, then by the real imparting of ſuch a degree and proportion of heat, as, according to the pre-diſpoſition of ſeveral bodies, is requiſite thereunto. Neither does it at all follow, that becauſe it is not generable and corruptible; therefore it is not hot: it may be one, without the other: ſo that as it is not deemed to be the efficient cauſe of heat, hence I make account appears,that it is alſo the ſubject and original of heat. Which if it were not, I ſee not how it could be the efficient cauſe: for all things do beget heat, either by motion and attrition of another body, or by communication of heat from it ſelf. Since therefore the Sun does it not the firſt way, it muſt do it the ſecond way, and conſe-

quently be in it ſelf ſubjectively hot.

Secondly, for Scripture-Arguments, many might be urged; but one will be ſufficient, from the 19 Pſalm, where you ſee heat attributed to the Sun. And it is further obſervable, that in no part of the Scripture, the heat in ſublunary bodies is referred to the element of Fire, but always to the Sun.

What is it that in great Drouths burns up the Paſture-grounds, the trees, and * corn, but the continual afflux of the Suns heat, without the ſeaſonable interpoſition of rain or clouds? what is more clear to our own experience? So that we have as little reaſon to deny its heat, giving credit to our ſenſe of Feeling, as we ſhould have to deny its light, believing our ſenſe of Seeing. *Mat. 13. 6

Qu *What other obſervation may be of the Sun?*

*A.* This Planet doth properly rule and order the courſe of the four Seaſons of the year, in that heaven where now it is.

Qu. *What if it were higher or lower then it is?*

*A.* Then the ſeaſons of the yeer would be out of order, and quite overthrown: wherefore obſerve, that the Sun, in his proper and in his irregular courſes, (occaſioned by the motion of the firſt Moveable) doth (in the heaven where God placed him) temper and allay, by his heat, the extreme coldneſs of the skie, *Saturn*, and the Moon.

Now if the Sun were in the place of the Circle of the Moon, and the Moon above in the place or Circle of the Sun, the earth would be burned with the heat thereof: and if, on the contrary, the Sun were in the heaven of *Saturn*, he would be too far diſtant from the earth; which would wax cold by reaſon of the Moon, and too little heated by the Planets *Mercury*, *Venus*, *Mars*, and *Jupiter*; ſo that it would bring forth nothing.

Here is the wiſdom of the Creator ſeen, in placing the Sun where it is, for the good of all ſuperiour and inferiour bodies.

Qu. *What do you mean, when you ſay that the Sun in his proper and in his irregular courſes is ſo beneficial to the earth,* &c. *Is the courſe of the Sun at any time irregular, or not in a right rule? If it be ſo, how comes it to paſs, that from day to day thorowout the whole yeer, he turning* *about the world, cauſeth the days and the nights ſo equally to appear unto us, anſwerable to the ſeveral ſeaſons of the yeer?*

*A.* The word *irregular* is not here to be taken in his proper and genuine ſenſe. For the Suns motion is always properly regular; otherwiſe no certain ſcience could be made of its Revolutions and Courſes, in, to, and from the parallel Circles, nor its Eclipſes, and the ſeaſons of the year.

By *irregularity*, therefore, is underſtood its obliquity, for that it proceeds not in a line ſtraitly circular, but oblique, according to the obliquity of the Zodiack.

When then the Sun is ſaid to be in his irregular courſes, thereby is meant its diſtance from the Ecliptick Line, and its approximation to the Tropicks; by means whereof, the Seaſons of the year are varied, each part of the yeer having thereby a different proportion of heat from his body, the fountain and original thereof.

Q. *How doth the Sun cauſe the day and the night to appear?*

*A.* * He turns continually about our Hemiſphere the one half of the day, and in like maner the other half he

* Pſal.19.6

turns about the other Hemiſphere which is oppoſite to ours: but in his abſence from us, whiles he remains there, the night comes upon us, by reaſon of the ſhadow of the earth.

Q. *The ſhadow of the earth then it ſeems cauſeth darkneß, which we call night; above or beyond which ſhadow, there can be no darkneß, but a continual light round about the world. What therefore may be the extent of that ſhadow?*

*A.* The extent of the ſhadow of the earth is 74 thouſand 602 miles.

Q. *How is this diſcerned?*

*A.* It would be too tedious to ſhew the grounds of proceeding to the ſolution of every Queſtion. But, that you may not doubt the grounds to be good and ſubſtantial, you ſhall have ſatisfaction to this your curioſity, by theſe Rules following.

1. Note that the diſtance of the Sun from the earth is 4169955 miles.

2. The diameter of the earth is 6782 miles.

3. The Suns diſtance I divide by the earths diameter, and finde the quotient to be 614. and ſo many times the diameter of the earth, reaches up to the Sun.

4. I proportion by the Compaſs the diameter of the earth, in a Figure the length of a Barley-corn, (or third part of an inch :) which being divided by 8, makes 204 inches ; and that being divided by 12, comes to 17 foot.

5. I chuſe a Plain Level juſt of that length, *viz.* 17 foot ; upon which, at one end, I place the figure of the earth ; and at the other end thereof, I ſet a light in proportion to the Sun.

6. The ſame light being at that diſtance from the figure of the earth, makes the ſhadow thereof to be 11 times the length of the ſaid diameter.

7. I multiply the ſaid diameter, which is (as above) 6782 miles, by 11, and that produceth 74602 miles; which is the length of the ſaid ſhadow, and may well cauſe ſo great a darkneſs as night it ſelf is to our ſight, notwithſtanding the greatneſs and glorious light of the Sun.

Q. *What is the daily circular courſe of the Sun?*

*A.* 25 millions 19 thouſand 732 miles.

Qu. *How many thouſand miles then doth he run in a minute of an hour?*

*A.* Although we perceive him not

to budge, nor know any thing of his going, but when he is advanced in his courſe; yet in one minute of an hour he runs 17 thouſand 381 miles $\frac{3}{4}$.

Qu. *It ſeems then that the Sun is carried about the heavens and the earth, and accompliſheth his circular courſe, in 24 hours: What benefit ariſeth thereby?*

*A.* The Sun, by that ſweet benefit, and agreeable revolutions of the day and the night, gives reſt, eaſe, contentment, and delight to man, and all other living creatures.

Beſides, it is the will of God that the Sun ſhould carry the light round about the world every day, that thereby the excellent riches and beauty of his works may the better appear.

So that life and light are the two effects of the Sun, which rules the day, as the Moon doth the night.

Qu. *What may be ſaid of the Eclipſe of the Sun?*

*A.* Concerning the Eclipſes, which word ſignifies a defect, or failing, becauſe that when the Eclipſes happen, it ſeems unto us, that the Sun and the Moon are defective and failing: but that cannot be properly ſaid of the Sun, in the ſame ſenſe as it may be ſaid of the Moon

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For although the Moon meet in oppoſition, (the earth between both depriving us of the light of the Sun) yet that happens not thorowout all the climates of the Hemiſphere, becauſe the body of the Moon is too little to hide from us the body of the Sun in the ſaid climates. Wherefore the Eclipſe of the Sun ought rather to be called a clouding or obſcuring skreen from us, rather then an Eclipſe, or failing in it ſelf. But that of the Moon, by being ſometimes at the Full, yet is ſuch,as no climate for the ſpace of many hours enjoys the light at all; upon which accidents follow divers changes and alterations in the world.

Qu. *How far is this glorious Planet above* Venus?

*A.* 3 millions 339 thouſand 796 miles.

Qu. *What is then his diſtance from the earth?*

*A.* When he is in his Apogea, that is, at the higheſt, his diſtance is 4 millions 329 thouſand 244 miles. And when he is in his Perigæum, that is, at the loweſt, he is then diſtant from us 4 millions and 14 thouſand miles.

Qu. *What is the difference betwee thoſe two diſtances?*

*A.* The difference (that is to ſay) between the Sun in Summer and Winter, is 315 thouſand 244 miles. S that the Sun draws neerer unto us, o runs from us, according as the day lengthen or ſhorten, 836 miles every day thorowout the year.

Qu. *Is not the Sun of an equal diſtan from the earth in winter as in ſummer, a the other Planets are, notwithſtanding the ſeveral motions?*

*A.* Yea, it is the ſelf-ſame diſtance i both ſeaſons, as well when he is in th Winter as in the Summer-Solſtice.

Qu. *Why then do you make ſuch a diſtinction, as if the Sun were ſo many hundred thouſand miles neerer the earth i Summer then in Winter?*

*A.* It is not meant of the whol earth, but of this or that part thereof, to which it is ſometimes neerer, and ſometimes further off. A ſuppoſe *England*, *Spain*, *Germany*; th difference of Seaſons being reckone with reference to ſeveral Countries in ſome whereof, at one and the ſam time it is Winter, when in other ſome it is Summer; according to it approach to, or diſtance from the earth.

So that although the Sun is always equidiſtant from the earth, yet to this or that part, it hath at ſeveral Seaſons its approaches.

Qu. *What then is the true diſtance of the Sun from the earth?*

*A.* 4 millions 169 thouſand 955 miles $\frac{2}{5}$.

Qu. *How great is this Planet?*

*A.* It is 166 times bigger then the earth.

Qu. *What is the diameter thereof?*

*A.* 45 thouſand 450 miles.

Qu. *What is the circumference of the circle or heaven of this Planet?*

*A.* 25 millions, *&c.* of miles (as is before expreſſed.)

Qu. *How many times greater is the Sun then the Moon?*

*A.* Although the Sun and the Moon (*which are called the two great lights) appear of a like bigneſs unto us, yet is the Sun 6 thouſand 640 times greater then the Moon. *Gen.1.16

Qu. *What may be obſerved by this deſcription of the Sun?*

*A.* When we ſeriouſly conſider what good all inferiour bodies receive thereby, by, the greatneſs, ſwiftneſs, and diſtance of this Planet from us, his daili oblique courſe, his ſubſtance, form, Eclipſes, motions, and conjunctions co contrary motions; we ſhall have ju cauſe to adore and reverence the admirable wiſdom and power of the Creator, in ſuch an excellent and wonderful body as that of the Sun; and no ſlightly paſs over, as the maner is, bu ſtand amazed thereat.

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## Chap. XII.

### *Of* Mars.

Qu. W*Hat Planet is that which i next above the Sun?*

*A. Mars*; which is the third Planet.

Qu. *Why is this Planet ſo named?*

*A.* The word *Mars* ſignifies War: alſo it ſignifies red, or enflamed; and i ſo named, becauſe he is next unto th Sun, and by its influence makes th ſublunary bodies fierce and violent.

Qu. *How far is this Planet above th Sun?*

*A.* 1 million 936 thouſand 78 miles.

Qu. *What is then his diſtance from the earth?*

*A.* 6 millions 108 thouſand 408 miles.

Qu. *How great is this Planet?*

*A.* Half as big again as the earth.

Qu. *What is the diameter thereof?*

*A.* 9 thouſand 450 miles.

Qu. *What is the circumference of its heaven?*

*A.* 36 millions 650 thouſand 448 miles.

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## Chap. XIII.

## Of Jupiter.

Qu. W*Hat Planet is next above* Mars?

*A. Jupiter*; which is the ſecond Planet.

Qu. *What is the meaning of the word?*

*A.* The word *Jupiter* (in the Original) ſignifies quickning, or life-giving: the word alſo ſignifies, Gods aſſiſtance towards his creatures.

Qu. *What is the influence of this Planet?*

*A.* It is obſerved, that the influence

of this Planet is very temperate ; am that one while it warms the coldneſs o the ſuperiour Planet *Saturn*, and othe whiles doth moderate the heat of th Planet next under it, which is *Mar* It doth alſo graciouſly help and relie the inferiour bodies.

The Heathen obſerving the ſweet influence of this Planet , made it the great God.

Q. *What is the nature of this Planet*

*A.* It is hot and moiſt temperate.

Qu. *How far is this Planet abo* Mars ?

*A.* 37 millions 891 thouſand 59 miles.

Qu. *What is then his diſtance fro the earth ?*

*A.* 44 millions of miles.

Qu. *How great is this Planet ?*

*A.* 91 times greater then the eart

Q. *What is the diameter thereof ?*

*A.* 31 thouſand 200 miles.

Q. *What is the circumference of i heaven ?*

*A.* 264 millions of miles.

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## Chap. XIV.
## Of Saturn.

Qu. W*Hat Planet is that next above* Jupiter ?

*A. Saturn* ; the firſt Planet.

Qu. *What is to be obſerved concerning this higheſt Planet?*

*A.* This celeſtial body is neereſt unto the eighth heaven of the fixed ſtars, and is exceeding cold, (partaking more thereof) becauſe ſhe is the neereſt (of all the other Planets) unto the celeſtial waters, (which are above the firmament) where the heat of the fixed ſtars is qualified by that exceeding great ſtore of waters.

Qu. *How come the Aſtronomers to know that this Planet Saturn is cold, (as the Moon in like maner is) and the reſt of the Planets hot?*

*A.* It is confeſſedly known, that by the natural vertue and power of the Stars, heat and cold, and many other manifeſt and occult qualities are projected and beſtowed upon the ſublunary bodies. And it cannot be otherwiſe proved by any firm and ſolid reaſon, why the Stars, which are light and bright bodies, and as it were candles enkindled in the world, and placed by God in heaven, by their periodical motion and diurnal revolution ſtirring up all things to production and generation, ſhould not be ſaid to be habitually hot: for all the Stars are hot more or leſs, becauſe they are all bright, clear, and light, more or leſs. And by how much the brighter they are, by ſo much the hotter they are.

Hence the Sun is moſt manifeſt in his heat, becauſe moſt manifeſt in his claritude and brightneſs; which is to be underſtood onely of heavenly light, which by its nature ſhews its effects in calefaction, vivification, generation, production, *&c.* For the light that we ſee in Cryſtal or Ice, is not hot, neither doth it heat, becauſe they have not in them the principles of calefaction. And ſo when *Saturn* is ſaid to be cold, or the Moon cold, it is to be underſtood comparatively for leſs hot.

And ſo *Saturn* may be ſaid to be hot, becauſe he is clear; yet becauſe he effecteth cold more then heat, therefore he is ſaid to be cold. For all Ages and modern experience knoweth, that when *Saturn* is in conjunction or radiation with the Sun or Moon, the two great Lights, he diminiſheth heat in the hot ſeaſons of the year, and augmenteth cold in the colder times; therefore he is ſaid to be cold. Beſides his propinquity to the Starry heaven, great diſtance from the earth, and his intrinſecal hidden qualities of cold operation, he prohibits the heat to deſcend.

And this ſufficeth for anſwer to this queſtion.

Q. *What is the influence of this Planet?*

*A.* It makes the body chill, melancholy, and dry.

Q. *How far is this Planet above* Jupiter?

*A.* 28 millions of miles.

Q. *What is then his diſtance from the earth?*

*A.* 72 millions of miles.

Qu. *How great is this Planet?*

*A.* 96 times greater then the earth.

Qu. *If this Planet or wandring ſtar be ſo many times greater then the earth, then how many times is it greater then that little ſtar* Mercury, *the leaſt of all the Planets?*

*A.* Although theſe two Stars appear to us almoſt of equal bigneſs, yet is *Saturn* 301 thouſand 728 times bigger then *Mercury*; and the reaſon is, in regard of that exceeding diſtance it is above the ſame, which is 71 millions 483 thouſand 472 miles.

Qu. *What is the diameter of this great Planet?*

*A.* 37 thouſand 800 miles.

Qu. *What is the circumference of its heaven?*

*A.* 432 millions of miles.

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## Chap. XV.

### *Of the eighth or ſtarry heaven.*

Qu. W*Hat heaven is that which is next above the heaven of the Planet* Saturn?

*A.* It is that heaven commonly called *the firmament*; which heaven embraceth and comprehends all the aforeſaid heavens or circles of the ſeven Planets. * Gen. 1. 6.

Qu. *Of what ſubſtance is this firmament of heaven?*

*A.* This great extent is not of a thin ſubſtance, as is the Water, the Air, or the Fire; nor of a groſs and obſcure ſubſtance, as the Earth: but * being of a ſubſtance without compariſon finer * Exod. 24. 10.

and thinner then any under it, gives place to thoſe bodies that are more ſolid. Whereupon ſome Philoſophers have very well ſaid,that the Firmament is not properly ſolid, thin, heavie, nor light, as the other bodies are.

Qu. *What are the principal Circles in the Celeſtial Globe, ſo much obſerved by Aſtronomers?*

Theſe ſix: *viz.*

1. The *Æquator*, or *Æquinoxial*; which is a great Circle placed in the middle of the Sphere, between either or both Poles of the world; and divides both Poles by equal ſpaces the heavens, and croſſes the Zodiack in two points, *viz.* *Aries* and *Libra*; which when the Sun comes to it, cauſes equal day and night thorowout the world, under the Poles excepted.

2. The *Zodiack*; which is ſo called, from the Greek word *Zoes*, which ſignifies life, becauſe it is the path of the Sun, who is called the Author of life. It is a bowing Circle, and croſſeth thwartly the Æquinoxial and firſt Mover, and appears bending in reſpect of the Poles of the world, and from them is unequally diſtant. It is one of the 6 principal and greateſt Circles in the

Firmament, in which the 12 Signes are placed; having a circular Line in the midſt thereof, called *The Ecliptick Line*.

3. The two *Colures*, which are generally called *The Great Circles*, drawn by the Poles of the world; which take their names from the Greek word *Kolouro*, which ſignifies *unperfect*, for that they never are ſeen whole in the turning about of the world, as the other Circles are.

4. The *Meridian*; which is a great Circle that goeth by the Poles of the world, and the highth of any place.

5. The *Horizon*; which is a Circle that divideth the upper half Sphere of the Firmament from the lower half Sphere which we ſee not.

6. The two *Tropiques*; which are ſo called, from the Greek word *Tropequoy*, which is as much as to ſay, *Turnings again*; for that when the Sun is digreſſed from the Æquator, and comes unto thoſe points, he turns back again.

Theſe two touch the Zodiack at the beginning of *Cancer* and *Capricorn*; *Cancer* being Northerly, and the Summer-Circle to thoſe on this ſide the Æquinoxial; and *Capricorn* Southerly, and the Winter-Circle to us, but *contra* to thoſe on the other ſide of the Æquinoxial.

Qu. *Why is the Circle of the Zodiack oblique or overthwart, and not exactly or ſtraitly circular, as that of the Æquinoxial?* &c.

*A.* For the better diſtribution of the vivid heat of the Planets to ſeveral parts of the earth. For if they, eſpecially the Sun, ſhould have moved in a ſtrait Circle without obliquity, but a ſmall part of the earth would have enjoyed the comfort of their heat and influence; and that alſo in ſo high a degree, that it would have rendered e en the part uncomfortable for habitation, as it is under the Æquinoxial. Whereas now, by their oblique courſe, they communicate themſelves in ſome proportion to the whole earth, begetting thereby the diſtinction of times, and the various ſeaſons of the year, and the different temperature of ſeveral Regions and Countries.

Qu. *How broad is this Circle?*

*A.* The bredth of it is 12 degrees.

Qu. *How much is that?*

*A.* 1. Upon the earth, it is 720 miles.

2. In the Circle of the Moon, it is

32 thouſand 85 miles ;.

3. In the Circle of the Sun, it is 833 thouſand 991 miles.

4. In the Circle of the Starry heaven, it is 23 millions 200 thouſand miles.

Qu. *What are the 12 Signes in the Zodiack?*

*A.* They are a certain number of ſtars, repreſenting 12 ſeveral forms or figures, ſome of humane ſhape, ſome of other creatures: but are ſo called, for diſtinction-ſake; as the number of ſtars repreſenting a Ram, is called *Aries*; thoſe of a Bull, is called *Taurus*; and ſo of the reſt. Not that there are any ſuch creatures in the Zodiack, or that they have any real reſemblances, but that they are ſo called for diſtinction ſake, (as aforeſaid.)

Qu. *What are the two Poles?*

*A.* The two Poles, *viz.* the North and the South Poles, are the two ends or points of the Aſtronomical Axletree, upon which the heavens are imagined to be turned.

Qu. *What are we further to conſider of this eighth heaven?*

*A.* The glory and beauty thereof; it * being enriched, bedecked, and adorned

* Gen. 1. 16, 17. Ch. 15 5. Job 26.13

ed with millions of golden gliſtering ſpangles, which are the fixed ſtars; which ſerve not onely for an ornament to the heavens, but likewiſe (although ſo * high above the Planets) * have their influence, vertue, and efficacie, whereby they alter and change the air, the ſeaſons of the year, and inferiour bodies, in a wonderful, ſtrange and ſecret maner.

*Job 22.12
* Chap.38. 31,32,33.

Q. *Are all theſe * numberleſs * number of ſtars of uſe?*

*Gen.15.5
*Pſa.147.4

*A.* Certainly God made all the Celeſtial bodies, as the fixed Stars, and the Planets, ſo great, and ſuch a number of lights, ſo hot, with ſuch motions, that we cannot think * that he made any one of them in vain, * but all for his own pleaſure, and for the benefit and good of the earth, the ſea, and all things therein contained.

*Iſa.45.18
*Rev.4. 11

Q. * *One ſtar differeth from another in glory and in greatneſs. What may be obſerved concerning the ſame?*

* Cor.15. 41.

*A.* Aſtronomers have taken ſpecial notice of the number of 1025 of the principal apparent noted Stars of all the reſt: of which number they obſerve as followeth, *viz.*

| | | | | |
|---|---|---|---|---|
| 1. Of the leaſt ſort, | 55 | to be | 88 | times bigger then thee earth. |
| 2. Of the next greatneſs, | 221 | | 36 | |
| 3. Of the third greatneſs, | 280 | | 54 | |
| 4. Of the fourth greatneſs, | 208 | | 22 | |
| 5. Of the fifth greatneſs, | 46 | | 87 | |
| 6. Of the greateſt of all, | 15 | | 107 | |

Note alſo, that ſome other of thee ordinary ſtars are much bigger then thee whole compaſs of the earth; ſome again are much leſs then the earth : but the leaſt of all the ſtars in that heaven are bigger then the Moon.

Q. *What thoughts ſhould the conſideration of theſe wonderful works of the Lord ſtrike into our hearts?*

*A.* Such thoughts and meditations as *David* (that great obſerver of the heavens) had upon this ſubject. For When he walked out in an evening to contemplate, he looking up to heaven, with
Pſal. 8. 3,4. admiration, ſaid, * *When I conſider thy heavens, the work of thy fingers, the moon and the ſtars which thou haſt ordained ;*

*what is man, that thou art mindful of him; or the ſon of man, that thou viſiteſt him?*

Note here what the Prophet ſaith, that this great fabrick of the Lord is the work of his fingers; as if he needed not to have put the ſtrength of his hand or outſtretched arm thereunto: ſo eaſie it was unto him.

Qu. *Have not the ſtars in this heaven a motion in themſelves, as the Planets have in their heavens?*

*A.* They have a proper motion of their own, and move 50 ſeconds (which is 26851 miles $\frac{2}{3}$) in a year, and but a degree in 72 yeers; and in a day, they move 8 thirds & 10 fourths, and perform their whole courſe exactly in 25 thouſand 920 yeers; in which time they move 360 degrees, which is their whole circumference, and that amounts unto 696 millions of miles, accounting 1 million 933 thouſand 333 miles $\frac{1}{3}$ to a degree in that Sphere. So that theſe ſtars are advanced in their courſe ſince the time of their creation, which is 5603 yeers to this preſent year of our Lord 1654. the number of 77 degrees, 48 ſeconds, 41 thirds, and 23 fourths; which comes to 150 millions 433 thouſand 83 miles; which is but the $\frac{5}{16}$ part, and a little more, o their whole courſe and circumference.

And all this is to be underſtood *in motu rotundo*, that is, in a round co whole motion and number: for their will be fractions, though inſenſible yea, and undemonſtrable and impe ceptible, in thoſe vaſt bodies, in ſ great a ſpace of time, let us comput never ſo exactly or preciſely, nay not ſ much as the ſmalleſt ſand in an Hour glaſs.

Qu. *You ſay, that the daily motion o the ſtars (which is the proper motion o their own) is* 8 *thirds and ten fourths pray how much doth this contain in th heaven where they are placed, and upo the earth, to anſwer that dimenſion?*

*A.* That meaſure in longitude con tains in that heaven 73 miles $\frac{3}{60}$. which is upon the earth (to anſwer the ſame) but 3 yards $\frac{2}{3}$, leſs $\frac{1}{60}$ part of a foot and is the ſloweſt motion of thoſe great bodies in that vaſt Sphere, as can poſſibly be (in this nature) demonſtraſtrated: which is the main reaſon it is ſo many thouſand yeers before they can perform their courſe.

Qu. *How is this proved ?*

*A.* Thus : Firſt,

| | | | |
|---|---|---|---|
| A Degree | is in that eighth Sphere | 1933333 $\frac{1}{3}$ | miles |
| A Mile | | 32222 $\frac{13}{60}$ | |
| A Second | | 537 $\frac{2}{60}$ | |
| A Third | | 8 $\frac{57}{60}$ | |

| | | |
|---|---|---|
| The 8 miles is | 64 | miles. |
| The 8 $\frac{57}{60}$ is | 7 $\frac{36}{60}$ | |
| The 10 fourths, which is $\frac{1}{8}$ part of a third, is | 1 $\frac{57}{60}$ | |

So that 8 thirds, and 10 fourths, is in that heaven 73 miles $\frac{5}{60}$.

Secondly,

A Degree upon the earth is 60 minutes or miles.

| | | | |
|---|---|---|---|
| A Mile | is upon the earth | 5280 | foot. |
| A Second | | 88 | |
| A Third | | 1 $\frac{28}{60}$ | |

| | | |
|---|---|---|
| The 8 foot is | 8 | foot. |
| The 8 $\frac{28}{60}$ is | 3 $\frac{44}{60}$ | |

So that 8 thirds and 10 fourths on the earth is 11 foot $\frac{44}{60}$.

Which is 3 yards $\frac{2}{3}$ leſs $\frac{1}{60}$ part of a foot (as aforeſaid.)

Q. *If*

Qu. *If the ſtars have ſuch a motion why are they called fixed ſtars ?*

*A.* They are ſo called, for that the keep the ſame poſition and diſtance on to another as at the firſt God create them in : which *Solomon* knew ful well.

Qu. *Some ſuppoſe that the ſtars ar placed in this heaven, like the knots in knotty board, or the nails in a cart-wheel and ſo are moved according to the moving of this Sphere, and are carried about i their circle, as a man is carried about i a chariot or coach upon the land, or in ſhip upon the water. What is your opinio in this?*

*A.* Though a man be in a Coach o Ship, he is not ſo faſtened thereunt but that he may remove himſelf from one ſide, or from one end to the othe in that Coach or Ship wherein he is which Coach or Ship puts forward,notwithſtanding the mans motion therein And ſo it is concerning the motion o the Stars (in this heaven) which are no otherwiſe faſtened thereunto.

Q. *There are ſome ſtars in a clear evening, that ſeem to ſhoot from one place t another, or to fall with a wonderful ſwiftneſs: what is the reaſon thereof?*

*A.* They are not Stars, nor have any part or ſpecies of them: but that which ſeems to fall, is a ſulpherous or bituminous matter, extracted by heat and influence of the heavenly bodies, elevated into the higher region of the air; and having not ſufficient nutriment being enkindled, and participating of a terreſtrial, igneal, aerial quality, ſeems to come from ſome ſtar, and fall to the earth; whereas in truth there is no ſuch hing: for the ſtars cannot fall. But ſuch Meteors as theſe are called *Stellæ caden-es*, falling ſtars, from the reſemblance hey have to ſtars, though in reality hey are not ſuch, nor hold any conſiderable proportion with them.

Q. *In what time are the ſtars (by the motion of this Sphere unto which they are aſtened) carried about the world?*

*A.* In 24 hours; but not all alike, r of one ſwiftneſs: for thoſe that are urtheſt off from the Poles, are carried much ſwifter then thoſe that are neer he ſaid Poles; inſomuch that thoſe ſtars hat are in the middle of that heaven etween the two Poles, the moſt remote, are carried 483 thouſand miles n a minute of an hour.

Qu. *What is the obſervation of this?*

*A.* * The

*A.* * The unlimited power of th
*Pſa.147.5 Almighty God, who moves this grea
Orb, with thoſe two greater above it:
with the ſame facility, and with as muc
eaſe, as he moves the leſſer Orbs, or an
moveable thing under the ſame, bein
all alike to him: * for there is nothin
*Jer.32.17 too hard for him, how difficult ſoeve
it appear to us.

Q. *What may be ſaid of certain ſtar*
*that are mentioned in the holy Scriptures*
*Job 9.9. *as* * Arcturus, Orion, *and* Pleiades
*Ch.38.31 * Mazzaroth, Arcturus with his ſons
*Ch.26.13 *the* * crooked Serpent, *the* * Seven ſtars
*Amos 5.8 *&c.*

*A.* Not troubling you with the interpretation of their names, much le with the profane Poetical fictions abou theſe ſtars, the beſt Expoſitors ſay that by a figure of ſpeech, putting th part for the whole, under theſe few being very eminent and conſpicuous the reſt of the ſtars are comprehended ſome being of a conſtringent or freezing nature, as *Orion*; others of a moi nature, producing pleaſant ſweet ſhowers, as *Pleiades*, or The ſeven ſtars: an ſo of the reſt.

And if we will know the propert of theſe ſtars, that we may underſtan theſe places of Scripture, the Art of Aſtrologie is to be enquired diligently into, as St. *Auguſtine* ſaith, in his expoſition of the 38 chapter of *Job*: but with what certainty, let the Wiſe determine.

Qu. *How far is this eighth Sphere above the Planet* Saturn?

*A.* As far as *Jupiter* is above the earth, which is 44 millions of miles.

Qu. *What diſtance then is it from the earth?*

*A.* *It is of a wonderful diſtance from us, being 116 millions of miles. *Job 22.12

Qu. *What then is the circumference thereof?*

*A.* 696 millions of miles.

Qu. *What difference is there between the Globe of the earth, and this celeſtial Globe?*

*A.* The Globe of the earth, to our capacity and apprehenſion, is a mighty vaſt and ſpacious thing, whoſe circumference makes ſo many thouſand miles, (as is before expreſſed:) but in the hands of the Creator of it, *it is leſs then the leaſt ſand, or ſmalleſt duſt that is. *Iſa. 40. 15

Now ſuppoſe the diameter of the earth (by a Figure) be the 24 part of the length of a barley-corn, (which is hardly diſcerned) to anſwer this dimenſion according to the aforeſaid diſtance of that heaven from the earth, the ſemidiameter of that glorious heaven is 6 yards, 7 inches $\frac{1}{3}$, and $\frac{1}{3}$ part of a barley-corn; which is according to that proportion and meaſure figuratively the diſtance of that heaven from the earth.

Now as the 24 part of the length of a barley-corn, is to the length of 6 yards 7 inches, *&c.* ſo is the terreſtrial Globe compared to the celeſtial; which, with the compaſs thereof, is but a very little prick or ſpeck, (though a great matter to us) if it be compared with the bulk or compaſs of the Starry heaven.

Q. *The diſtance of this ſtarry heaven from the earth is ſo great, as can hardly be comprehended in the mindes and judgements of moſt men. For* 116 *millions of miles is ſoon ſpoken, but not ſo eaſily underſtood. Wherefore what familiar example or ſimilitudes have you, to make it more perſpicuous and clear, for the better underſtanding thereof?*

*A.* Theſe three ſimilitudes following, for the preſent may ſuffice, *viz.*

1. Note that ſo many Peper-corns

as there are miles betwixt the earth and that heaven, will amount unto 5 Tun ½, 3 C. 2 Q. 7 Li' and ¼ of an ounce.

2. If it were poſſible that a ſtone ſhould be let fall from thence, of that bigneſs and weight, as it ſhould be continually a-falling 150 miles an hour, until it ſhould fall to the earth, it would be 88 yeers, 3 months, 2 weeks, 4 days, 5 hours, and 20 minutes, falling down from thence to the earth.

3. If *Adam* had lived to this time, which had been 5593 yeers, and had taken his journey from the earth towards heaven, and had mounted every day 16 miles, from the time of his creation to this preſent yeer 1644. he had been advanced on his journey towards heaven but 32 millions 665 thouſand 120 miles: which is 11 millions 336 thouſand 880 miles ſhort of the Planet *Jupiter.*

Q. *This is enough to ſtartle the judgements of the greateſt, wiſeſt, and moſt learned men in the world: how then can people of mean capacity judge of it?*

*A.* Let the meaneſt capacity, as well as the moſt judicious, take notice, that this deſcription is not ſo much for ſpe-

culation, but rather to ſet forth the
mighty works of the great Architector
and mighty Monarch of this immenſe
* Pſal.89.5 fabrick of heaven and earth, * and to
* Iſa.57.15 declare his praiſe, * and to cauſe men
to be more humble, who are ſo exceed-
* Luke 12. ingly buſied, and * careful for the things
18,19. of this world; as if all their happineſs
conſiſted onely in the enjoying of the
poor, vain, and ſuperfluous things
thereof.

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## Chap. XVI.

### *Of the ninth or Cryſtalline heaven.*

Qu. *WHat heaven is that which is next above the Starry heaven?*

*A.* The ninth Sphere; which is called *The Cryſtalline heaven.*

Qu. *Why is it ſo called?*

*A.* It may well be called *The Cryſtalline heaven*: for the Creator, having made of nothing, within nothing, the principles and grounds of things, made this firmament of water, ſo perfectly clear and purified as it is: which waters
* Gen.1,6. are thoſe waters * that were divided from the waters under the firmament;

which firmament(or heaven of the fixed ſtars) divided thoſe waters from the waters belowe.

Now thoſe waters * above all the *Pſa.148.4
heavens hitherto deſcribed, are clear and tranſparent as Cryſtal, thorow which one may ſee any thing beyond it.

Qu. *What are we to underſtand concerning thoſe waters?*

*A.* Note, that in the beginning of the creation of heaven and earth, darkneſs was upon the face of that unmeaſurable depth of waters, under which the earth (as is already alleadged) remained hidden. * The Spirit of God * Gen.1.2.
moved upon thoſe waters which were
ſeparated * and divided from thoſe wa- * Ch.1.6,7.
ters * which made the Sea, and at that *Verſ.10.
time were removed,and lifted up above the Starry firmament into the ninth heaven, * where they remain ſuſpended *Pſa.148.4
by the ſelf-ſame power that holds all the world ſuſpended and retained by his will.

Qu. *Is this probable?*

*A.* It is without contradiction, if we conſider the univerſal flood: for
* *Moſes* ſaith, that the ſluces and flood- *Gen.7.11
gates of heaven were let go: which

could not meerly be underſtood of the waters in the clouds, but of ſome other ſtore, ſurpaſſing in quantity all humane underſtanding.

Q. *What is the motion of this heaven?*

*A.* It is carried and born about by the tenth heaven in a violent maner, and hath its ſpecial motion; by vertue whereof, it carries the eighth heaven but very ſlowly and leaſurely from the weſt to the eaſt.

Q. *What is the diſtance of this heaven from the ſtarry firmament?*

*A.* In this deſcription of the three heavens which are above the ſtarry heaven, there is no uſe of Arithmetick: for their diſtance and circumference are not calculated, being a thing beyond the reach and knowledge of all the Arithmeticians and Aſtronomers that ever were in the world. Yet ſome are of opinion, that this heaven is as far above the ſtarry heaven, as that heaven is above the earth: and their reaſon is, becauſe that ſtarry heaven (called the firmament) * God placed in the midſt between the waters divided, (as is before mentioned.) *Gen. 1. 16

Qu. *What may be the reaſon that this heaven is placed next unto the firſt moveable heaven?*

*A.* To the intent that with the coldneſs thereof, it might aſſwage and repreſs the extreme heat of the ſame firſt moveable, which otherwiſe (as ſome affirm) with his ſwift and violent moving, would ſet all the heavens on fire.

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## Chap. XVII.

### *Of the tenth heaven, or firſt mover.*

Qu. W*Hat heaven is that which is next above the Cryſtalline heaven?*

*A.* The tenth heaven; which is named by ſome of our modern Aſtronomers, The great and firſt moveable heaven.

Qu. *What is obſerved of this heaven?*

*A.* This heaven, continually moving with an equal gate from eaſt to weſt, doth by reaſon of its violent ſwiftneſs, carry and turn about all the other heavens whether they will or no; ſo as they are forced to make their own proper revolutions, which are contrary, from weſt to eaſt, every one in longer or ſhorter time, according as they be far or neer placed to the ſame.

Qu. *What time hath it in its motion from eaſt to weſt?*

*A.* It hath one ſimple, pure, and daily motion, and that in 24 hours, from eaſt to weſt, between the two Poles, drawing with it all the other heavens, globes, and celeſtial bodies, yea, the elements alſo, which are more light and nimble.

Qu. *Is it not poſſible for great and learned Students in this Science of Aſtronomy, to finde out the height of this great Circle?*

*A.* No: their Teleſcopes, Optick-Glaſſes, Aſtrolobes, and all their Mathematical inſtruments, in this reſpect are laid aſide, and of no uſe.

Mans knowledge and judgement in this Art, reaches no further then to the heavens where God hath placed thoſe great lights, the objects of their calculations, being viſible to the eye.

In thoſe heavens above the eighth Sphere, there are no ſuch lights; and therefore the height of this heaven, the cryſtalline heaven, and the other above this,* is onely known to the great God that made them, and meaſured them.

*Iſ. 40 12 Ch. 48. 13.

Chap.

## Chap. XVIII.

### *Of the eleventh or Imperial heaven.*

Qu. WHat heaven is that above the *firſt moveable heaven ?*

*A.* The eleventh heaven, which divine Philoſophers call the Imperial or higheſt heaven ; and ſome call it the *Empyrean* heaven.

This heaven is far above all the heavens we have hitherto diſcourſed of, and comprehendeth them all.

Q. *Why is it called the Empyrean, or Imperial heaven?*

*A.* In regard of its brightneſs and ſplendor, and becauſe it excels ( in purity and clearneſs ) all the other heavens, as the element of fire excels the other elements.

Qu. *What may be modeſtly (without curioſity) conceived of this heaven?*

*A.* This heaven, as our ancient Divines (comparing Scripture with Scripture) do affirm, was created by God the firſt day that he began the creation of the world, and by him immediately repleniſhed with his miniſters and holy angels, and now is the *habitation of Gods elect ſpirits, where they are gathered, and there attend the reſt of their brethren, and the day of the reſurrection of the juſt; whoſe bodies being raiſed from the duſt of the earth, ſhall be re-united to their ſouls, and carried up into heaven, and there abide eternally with the Lord.

*Heb.12. 23.

*1Cor.15. 42,43,44.

This heaven, being the foundation of the world, is moſt rare, and pure in ſubſtance, moſt round of ſhape, moſt great in quantity, moſt clear in quality, and moſt high in place.

Qu. *Doth not this heaven move about, as do all the other heavens under it?*

*A.* No: this heaven is immoveable, as the earth is; ſo that all the heavenly motions which we ſee and know, are in that great ſpace between this Empyrean heaven and the earth.

Qu. *In the holy Scriptures we read of three heavens, whereas your diſcourſe hath hitherto been of eleven heavens. How is this reconciled?*

*A.* By thoſe three heavens, are meant thoſe three unmeaſurable heavens above the Starry heaven, the higheſt of which is the aforeſaid Empyrean eaven, which the Apoſtle *Paul* calls the third heaven, as is obſerved by earned Divines.

* 2 Cor. 12.2.

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## Chap. XIX.

### *How we may conceive of the heavenly bodies, and their motions.*

Qu. *WHat may thoſe heavenly bodies and motions be compared unto, to bring the knowledge of them more clear to the underſtanding?*

*A.* They have been frequently compared to the motions of a Clock or Watch, or the like; in which kinde of Inventions, the Germans have produced very rare and admirable works, as to the motions of the heavens, and heavenly bodies: but nothing (as is conceived) ever did, or can give ſo clear a light to the knowledge of the hights, diſtances, and greatneſs of thoſe wonderful bodies, as the ſight of the Spheres themſelves, framed and modeled by the Author of this work; which now remain in my Lord *Bacon*'s Colledge at *Lambeth-marſh* in the County of *Surrey*, being truely figured ont by the art of Arithmetick, and which have bee the occaſion of this Diſcourſe, that t thoſe Figures, and the heavenly bodie diſtances and proportions might b truely and juſtly underſtood. A which had been here preſented an printed in form of a Map, but that th greatneſs of thoſe heavenly Circles an Bodies,with their vaſt diſtances, rende them incapable of being repreſente in the largeſt paper, though folded never ſo much; the Figure at *Lambeth* being the leaſt that can be, and yet is above 20 foot in length.

Qu. *What is further to be conſidere concerning the form and beauty of th aforeſaid particular deſcription of the eleven heavens?*

*A.* They are every one ſo clear an tranſparent, that to the eye they ſeem but as one entire body, covering one another, like as if the ſeveral ſcales of an Onion were all of the pureſt cryſtal, being every one nevertheleſs of an exceeding great thickneſs.

Thus have you had a brief diſcourſe of the deſcription of the univerſall world. And yet there are hidden greater things then thoſe. For we have ſeen but a few of his marvelous works.

Qu. *How doth the knowledge of theſe wonderful works of God, advance his glory and praiſe in the mindes of men?*

*A.* Certainly, to an ingenious, ſolid, true Chriſtian ſpirit, delighted in knowledge, it doth very much. For if the heavens, and glorious lights thereof, be ſo beautiful, and of ſuch great power and vertue, that with the conſideration thereof, the heart is at once both delighted and aſtoniſhed; how much more excellent and mightier muſt he that created them appear! For whatſoever we have hitherto diſcourſed of, is but concerning the outſide of that high and glorious heaven, where that great high and mighty King, the Lord of heaven and earth, liveth and reigneth for ever.

## Chap. XX.

### *Of what in this life may be known of God; and of his glorious Throne, or habitation in heaven.*

Q. WHat in this life can be known of God, and of his glorious Throne, or habitation of heaven?*

*A.* The wiſeſt of the natural an moral Philoſophers, with all their help whether of Aſtronomy, Aſtrologie, an all natural endowments, have been bu dark-ſighted, as to the ſolution of thi Querie, as all their Writings and Diſcourſes manifeſt. So that the true anſwer thereunto, is, that it is impoſſibl for us to know more of God, or of hi glorious habitation, then he hath bee pleaſed to declare in his holy Word wherewith we are to be thankfully ſatisfied; there being therein ſo muc made known unto us, as ſufficeth th humble and meek for their comfort an conſolation.

Qu. *What briefly doth therein appear to ſatisfie ſuch as ſeek with honeſt and good hearts, minding the glory of God, and their own comfort, and not to ſatisfie their vain and fleſhly minde?*

ᵃ Deut. 34.5. * Num. 12.3.

* Exo. 33. from verſ. 18. to 23.

*A.* ᵃ *Moſes* the faithful ſervant of God, and meekeſt man upon the earth, out of his fervent zeal, and pureſt affection, made the like requeſt unto God himſelf, ſaying unto him, * *I beſeech thee ſhew me thy glory. And he ſaid, I will make my goodneſs go before thee, and will proclaim the name of the Lord before thee, and will be gracious to whom I will be gracious,*

*cious, and will ſhew mercy to whom I will ſhew mercy. And he ſaid, Thou canſt not ſee my face: for there ſhall no man ſee my face, and live. And the Lord ſaid, Behold, there is a place by me, and thou ſhalt ſtand upon a rock: and it ſhall come to paſs, while my glory paſſeth by, that I will put thee in a clift of the rock, and will cover thee with mine hand whilſt I paſs by: and I will take away my hand, and thou ſhalt ſee my back-parts, but my face ſhall not be ſeen.* *And the Lord deſcended in the cloud, and ſtood with him there, and proclaimed the name of the Lord: and the Lord paſſed by before him, and proclaimed, The Lord, the Lord God, merciful and gracious, long-ſuffering, and abundant in goodneſs and truth, keeping mercy for thouſands, forgiving iniquity, tranſgreſſion, and ſin, and that will by no means clear the guilty: viſiting the iniquities of the fathers upon the children, and upon the childrens children, unto the third and fourth generation. And Moſes made haſte, and bowed his head towards the earth, and worſhipped;* as being therewith fully ſatisfied; and which to us is a good example: for, *Whatſoever things were written aforetime, were written for our learning, that we through patience and comfort of the Scriptures might have hope.*

*Exod. 34. from verſe 5. to 8.

*Rom. 15. 4.

But if you would know yet mor
* Heb.12. 14. perfectly, * *Follow peace with all men and holineß, without which no man ſhall ſe the Lord* : ſetting our Lord Chriſt always before you ;
* Col.2.9. for * *in him dwellet all the fulneſs of the Godhead bodily.*

But when you have attained to th utmoſt this life is capable of, yet thi remains as your further comfort, (as i
* Iſa. 64.4. is written) * *Eye hath not ſeen, nor ea heard, neither hath it entered into the hear of man, the things which God hath prepared for him that waiteth for him.*

Qu. *What a pleaſant and precious wa is hereby effectually opened, to the moſt comfortable knowledge of God, and of his lov in Chriſt, which fully ſatisfieth the forme part of the queſtion concerning the knowledge of God! Pray proceed, and ſhew u briefly what the Scriptures hold forth o his moſt glorious Throne, and bleſſed habitation of heaven.*

*A.* The holy Prophet *David* ſeemeth in the ſpirit of propheſie, to have reſpect unto the moſt high and holy ha-
* Pſal.87. 1,2,3. bitation of the Almighty, ſaying, * *His foundation is in the holy mountain. The Lord loveth the gates of Zion, more then all the dwellings of Jacob. Glorious things are ſpoken of thee, thou city of God.*

As for the earthly *Jeruſalem*, though it were ſomewhat better with it in *David*'s time,* and much more glorious in the days of *Solomon*; yet the condition thereof was unſtable, and ſubject to many ſad alterations, as all earthly cities and things are; and as *Gal.* 4. hath it, * *For this Agar is mount Sinai in Arabia, and anſwereth to Jeruſalem which now is, and is in bondage with her children. But Jeruſalem which is above is free, which is the mother of us all.*

* 1 Kings 10.27.

* Gal.4. 25, 26.

But the *Revelation* of S. *John* the Apoſtle, affordeth moſt for ſatisfaction in this particular. For, ſaith he, * *I ſaw a new heaven and a new earth: for the firſt heaven and the firſt earth paſſed away; and there was no more ſea. And I John ſaw the holy city new Jeruſalem coming down from God out of heaven, prepared as a bride adorned for her husband.* * *And he carried me away in the ſpirit, to a great and high mountain, & ſhewed me that great city, the holy Jeruſalem, deſcending out of heaven from God, having the glory of God, and her light like unto a ſtone moſt precious, even like a jaſper-ſtone, clear as cryſtal; & had a wall great and high, and had twelve gates, and at the gates twelve angels, and names written thereon, which are of the twelve tribes*

* Revel.21 1, 2.

* Chap.21. from verſ. 10. to 27.

of the children of Iſrael. On the eaſt, three gates; on the north, three gates; on the ſouth, three gates; and on the weſt, three gates. And the wall of the citie had twelve foundations, and in them the names of the twelve apoſtles of the Lamb. And he that talked with me had a golden reed, to meaſure the city, and the gates thereof, and the wall thereof. And the city lieth fourſquare, and the length is as long as the bredth. And he meaſured the city with the reed, twelve thouſand furlongs: the length, and the bredth, and the height of it are equall. And he meaſured the wall thereof, an hundred and fourty and four cubits, according to the meaſure of a man, that is, of the angel. And the building of the wall of it was jaſper: and the city was pure gold, like unto clear glaſs. And the foundations of the wall of the city were garniſhed with all maner of precious ſtones: the firſt foundation was jaſper; the ſecond, ſaphir; the third, chalcedony; the fourth, an emeraud; the fifth, ſardonix; the ſixth, ſardius; the ſeventh, cryſolite; the eighth, beryl; the ninth, a topaz; the tenth, a chryſopraſus; the eleventh, a jacinct; the twelfth, an amethyſt. And the twelve gates were twelve pearls; every ſeveral gate was one pearl. And the ſtreet of the city was of *pure gold, as it were tranſparent glaſs. And I ſaw no temple therein: for the Lord God Almighty, and the Lamb, are the temple of it. And the city had no need of the ſun, neither of the moon, to ſhine in it: for the glory of God did lighten it, and the Lamb is the light thereof. And the nations of them which are ſaved, ſhall walk in the light of it; and the kings of the earth do bring their glory and honour into it. And the gates of it ſhall not be ſhut at all by day: for there ſhall be no night there: and they ſhall bring the glory and honour of the nations unto it. And there ſhall in no wiſe enter into it any thing that defileth, neither whatſoever worketh abomination, or a lye; but they which are written in the Lambs book of life.*

* *And he ſhewed me a pure river of water of life, clear as cryſtal, proceeding out of the throne of God and of the Lamb. In the midſt of the ſtreet of it, and on either ſide of the river was there the tree of life, which bare twelve maner of fruits, and yeelded her fruit every month. And the leaves of the tree were for the healing of the nations. And there ſhall be no more curſe, but the throne of God and of the Lamb ſhall be in it. And his ſervants ſhall ſerve him, and they ſhall ſee his face, and* * Rev.22. 1,2,3,4,5.

*his*

*his name ſhall be in their foreheads. And there ſhall be no night there: and they need no candle, neither the light of the ſun: for the Lord God giveth them light, and they ſhall reign for ever and ever.*

You ſee what a glorious deſcription here is; ſo full of variety, worth, and ſplendor, as if all the excellencies of all the Cities of the whole world were contracted into one, they would fall as far ſhort of this, as the glory of the Moon is of the glory of the Sun, and much ſhorter. Yet here you have the deſcription but of one City, the *New Jeruſalem* coming down from heaven: What then, or what poſſibility is there for any to imagine the moſt glorious glory of this higher heaven of heavens it ſelf! Now well may the Apoſtle ſay, * *Eye hath not ſeen, nor ear heard, nor hath it entered into the heart of man to conceive the things that are laid up for thoſe that love him.* * 1 Cor.2.9

Qu. *Here indeed is a divine deſcription of the heavenly Jeruſalem, worthy the contemplation of the moſt holy ſouls, and fit for ſuch onely as are moſt abſtracted from the earth and earthly affections; and it will be very neceſſary it be well obſerved and inſiſted on, as what is of moſt attra-*

*ctive power, to draw us neerer and neerer unto God. But ſeeing Arithmetick in all the former Queſtions hath been of a moſt beneficial and delightful uſe, it will be very contentful that thereby alſo this glorious city may be brought more familiar to every capacity, the ſame being numbered and meaſured out by the ſame meaſures and numbers as the celeſtial bodies have been.*

*A.* That ſhall be done. You are therefore to obſerve, that the citie lieth fourſquare, (as aforeſaid) and the length is as long as the bredth; and the meaſure of the citie 12 thouſand furlongs, which is no leſs in compaſs then 1 thouſand 500 miles; every ſquare thereof being 3 thouſand furlongs, which make 375 miles; each ſquare being 55 miles more then the full length of *England*: the diſtance between each gate, 1 thouſand furlongs, is 125 miles: the thickneſs of the wall, 144 cubits, which makes 72 yards, and the heighth as much; which wants but 14 yards $\frac{2}{3}$ of the height of *Paul's* Steeple in *London*; and the bredth of the wall on the top the ſame; being in every part moſt glorious, uniform, beautiful, and proportionable.

## Chap. XXI.

### *Inſtructions from the former Diſcourſe.*

Qu. B*Eing fully ſatisfied with your former Diſcourſe, and therefore not deſiring to multiply Queſtions* ad infinitum, *to the quenching of zeal and affection, which is too uſual; but to ſtop in time, and to be wiſe according to ſobriety: What (for concluſion) doth fairly ariſe as profitable inſtruction for all ſorts of people, from the former Diſcovery, and whole Diſcourſe?*

*A.* Certainly, that which is moſt wanting in the world, and that is, the ſtrongeſt motives to perſwade unto humility, that ever were brought to light. For alas, * how poor, indigent, and deſpicable a thing muſt man neceſſarily appear unto himſelf to be, yea, how even a nothing, when he hath but once conſidered the immenſe works of God, thus viſibly demonſtrated, and plainly calculated, hat he may as it were meaſure them out, as with a Rule, in his own underſtanding, men and women too, though indeed * there be not more

* Pſal. 8. 3, 4. Job 35. 6.

* Eccl. 8. 6. Rev. 3. 17. Job 11. 11, 12.

weak and wretched creatures living in this world, nor who live more irregularly, vainly, and ſinfully: yet how exceeding apt they are, upon the ſmalleſt trifling occaſions, to * ſwell, and vaunt themſelves, is as undeniable as ſhameful. For inſtance: * Pro.3.13.

* A ſhort-liv'd man, at beſt, yea, though through age (according to the courſe of nature) not far from his end, have he but oportunity of high place or power, how doth he in his heart (if not in his tongue) exalt himſelf, in *Nebuchadnezzar*'s language: * *Is not this great Babel which I have built by the might of my power, and for the honour of my majeſtie?* Let ſuch a one now ſeriouſly conſider what he hath read, or but look upon the Figure in the Sphere, and obſerve how little the whole earth is, in compariſon of the heavens, and how ſmall a Dominion he had, were he Lord of that, whereas what he commands is not in compariſon ſo much as an Ant-hill, * nor himſelf any other but even as an Emmet crawling upon it, and ſubject upon every accident to be ſquaſhed to dirt: and, if any thing, ſurely this conſideration will cauſe him * to humble himſelf under the mighty hand

* Pſal.90.10.
* Dan.4.30
* Iſa.40.22
* 1Pet.5.6.

of God, and not to deſpiſe the meaneſt
of mankinde, no not the meaneſt of
Gods creatures ; but to cry out, in the
* Gen. 32. 10. humility of his ſoul, **Lord, I am leſs then*
*the leaſt of thy mercies.*

*Jam.5.1, 2,3. Luke 12.17,18, 19. * A drudging Worldling, either born
to land or wealth, got by a father ſo
corruptly, that without repentance
*Hab. 2.9. went to hell-fire for it, *or who by ex-
action, or oppreſſion, or worldly
mindedneſs, attains but to ſome thou-
ſands, or but to ſome hundreds a yeer,
and under the title of Goodhusbandry,
*1 Joh. 3. 17. or providing for his family, * keeps it
together, and heaps up more, though
thouſands are ready to ſtarve for want
* Jer 9.23. Obad. v.4. Pſal. 49.6. of bread ; yet * how apt ſuch world-
lings are to pride and vaunt themſelves,
* Prov. 11. 12. * and to bear high upon their poor
neighbours, all men cannot but know ;
ſcorning and deſpiſing every one that is
not as rich as they ; puffing and blow-
ing, even with rage, if their wills may
not be their law, and bring all mens
conſciences, and perſons, and labours,
to their beck. Let ſuch as theſe take but
a dram of this diſcourſe in three days,
and it will certainly free him from this
mortal diſeaſe of his minde. For be-
*Pro.23.5. ſides that * riches make to themſelves

wings and flie away, how ſmall a handful, in compariſon of the whole, doth he, that hath moſt, poſſeſs? a miſerable ſmall quantity, God knows, for which yet he is but * a ſteward to the poor *Luk.16.2 and needy, and muſt one day render a ſtrict account thereof. If this will not cure him, let him but minde, * *Thou* *Ch.12.20 *fool, this night thy ſoul ſhall be required of thee, then whoſe ſhall thoſe things be, which thou haſt provided?* and if that cure him not, he is deſperate.

Is any one ſo ſimple as to be * proud *Jer. 9.23. of ſtrength? let him ſet his ſhoulders to the ball of the earth that hangs in the air, and try how he moves it. Better ſo, then waſte it on as vain attempts, *on *Pro.7.26. harlots, or in Gambols to ſhew and ſet it out, breaking his bones, and ſhortening his days, as if he were not to anſwer for that talent, or as if he thought * he *Pſa.100.3 had made himſelf,* or forgot his Maker *Eccl.12.1 in the days of his youth.

Is any in love with * their own or *Prov. 31. 30. others beauty, ſpending whole nights and days in contemplation of ſo airy a thing, and ſo proud upon it, as * to diſ- * Gen.29. 17,31. dain thoſe of another feature; yea, ſome ſo tranſported therewith, as to turn their faces from old-age, ſickly or hard-

favoured countenances, making jeſts,
jeers, and ſongs, of all deformed? Such
ſhould compare their own, and thoſe
they admire, with the beauty of the
Sun, and Cryſtalline heavenly bodies;
*Pſa.49.14 * the periſhing condition of the one,
* Pſal. 72. * and the permanence of the other;
5, 7. and conſider, that neither the deformed
*Pro.22.2. nor the beautiful * made themſelves,
* Ch.16.5. * and that nothing is ſo deformed in
God's account, as a proud perſon, man
or woman; nor any ſo beautiful in his
*Iſa.57.15 ſight, as * thoſe that are humble, and are
Mal.3.17. careful to fulfil his commandments.

What folly or fooliſhneſs is it for any
* James 2. * to be proud of Silks, Sattins, glorious
2, 3. colours, ſpangles, and ſhining laces! If
any ſuch there be, (as ſuch weak things
there are, too many) let them but
* Pſal. 8.3. walk out in a clear night, * and view
the innumerable glories of the Stars,
*Pſal.136. and but conſider their * magnitude, with
7,8,9. their * brightneſs, and, by the help of
* Ezek. theſe Rules, but aſcend according to
38.2. Progreſſion, until they come in their
Dan. 12.3. conſideration to the heaven of heavens;
and then ſee if any thing about them
be worth regarding. Certainly they
muſt needs ſee their ſenſleſs childiſh
folly therein, and for ever abandon it.

Ma

Many having paſſed but ſome ſmall voyage at Sea, or but traveled by land to *Rome* or *Mexico*, that have ſeen *Grand Cayre*,or the Country of the great *Mogul*, How apt are ſuch to pride and boaſt themſelves as far-ſeen men, and to undervalue ſuch as have not! To cure ſuch, *the conſideration of one days journey of the Sun,may more then ſatisfie. * Pſa.19.6.

* Some are taken exceedingly with their own ſwiftneſs, others with the ſpeed of horſes and other creatures; and being theirs, make a ſhift to be proud of their excellencies. But alas, what ſnails are theſe,to the infinite and unconceivable motion of the heavenly vaſt bodies! *Amos 2. 15.

What bragging and vapouring do we daily hear, about the rarity and variety of Jewels! *how highly are they prized! and how are they admired that poſſeſs ſome few of them! Whenas, if all in the whole terreſtrial world were contracted into one, nay, were the whole earth converted into onely one Jewel,and that alſo of the moſt deſired matter, every capacity caſting his eye up towards heaven, diſcerns at once *many that in all reſpects would far * 2 Chron. 32.27. Iſa. 39.2. *Job 26.13 Ch. 37 14.

ouroutvie it. So eaſily are we puffed up without a cauſe.

What emulations are there daily amongſt men of curious Inventions !!
†Dan.4.30 † ſome boaſting of this piece of Architecture, others of ſome admirable Motion; this of a new Engine, the other of another Curioſity : whenas all the wonders of man's Invention put together, come not neer what is contained in any one of the fore-going Queſtions and Anſwers. The conſideration whereof may very well correct the vanity of ſuch mens humours, and draw them to a ſight of their folly therein. For though their works are many of them commendable, and deſerve to be encouraged, † yet it is ſinful or ſimple to be
† Iſai.2.12 proud of any thing.

† Jer.5.30. Nay, † a horrible thing is committed
Hoſ.4.2. in the land:for many there are that †de-
†Pſal.109. light to hear themſelves and others, to
17. deſperate Oathes, Curſes, and new in-
†2Tim.3.2 vented Execrations ; † to blaſpheme
Rom.2.24 the great God of heaven and earth. O
would ſuch but read and conſider this Diſcourſe, and but thereby come (as it were) viſibly to ſee the wonderful Majeſtie of the Lord of heaven and earth it might be hoped they would be ther-

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by ſo aſtoniſh'd, that they would thenceforth † ſet a watch before the door of their lips, and never more be ſuch groſs offenders with their tongues, but rather as † *Paul*, converted by a light from heaven, of a perſecutor † became a Preacher of the Goſpel; ſo theſe, through the powerful influence of divine conſideration, of blaſphemers of God, joyn iſſue with the Pſalmiſt, and continually cry out, † *O ye mountains and all deeps, O ye waters that are beneath, and thoſe that are above,* &c. *bleſs ye the Lord, praiſe him, and magnifie him for ever: † yea, let every thing that hath breath praiſe his holy Name.*

†Pſa.141.3
† Acts 9. 3, 4.
† Verſ.20.
†Pſal.148. 4, 9.
†Pſa.150.6

The great † *Nimrods* and men-hunters of the world, that for their own ambitious ends, † make no conſcience or ſcruple to raiſe quarrels and diſſentions, turning whole cities and countries topſie-turvie, † rejoycing & taking pleaſure therein, as did that proſperous thief, (as one juſtly calls *Alexander* the Great.) Such as thoſe will finde by this Diſcourſe, that there is a greater then they, †before whoſe judgment-ſeat they muſt one day † give an account, when the meaneſt they have murdered and deſtroyed, will be in a better condition.

† Gen. 10. 8, 9.
† James 4. 1, 2.
† Pſal. 68. 30.
† Pſal.95.3
† 2 Cor.5. 10. Rom. 14.12.

And *the great contriver of miſchief
*Pſal.28.3. *1 Tim.6.5. * that turns godlineſs to gain; and
2 Pet.2. makes merchandiſe of the Word of
1,2,3. God; that belyes the heavenly influences,
and deludes the world; * that perſecute
*Rev.20.4. and aſperſe thoſe that will not
receive the mark of the Antichriſt, and
*1 Tim.4. of their falſe Prophet, * that make no
1,2. conſcience of their ways at all; hearing
or reading this diſcourſe, will finde a
cure for their Atheiſm; a conſcience
within them, whether they will or no,
*Pſa.58.11 that will enforce them to confeſs, * that
there is a reward for the righteous, and
that there is a God that judgeth the
earth.

And for thoſe that have eſcaped the
*2Cor.7.1. * filthineſs of the fleſh and ſpirit, though
*Mat.8.20 they are ſuch as * like their Lord and
Maſter, have not a houſe to put their
*Neh.4.4. heads in, * though they are deſolate, deſpiſed,
*2 Cor.4. and forſaken; yet knowing *their
17. ſhort afflictions are but for a moment,
and that there is laid up for them in
the higheſt heavens an eternal weight
of glory; And if they poſſeſs the preſent
greatneſs, power, and glory of the
*Iſa.24.4. men of the world, * yet it being fading
*1 Chron. and tranſitory, and knowing that * here
29.15. is no abiding place, they are to ſatisfie

their ſouls with this, * that they are not to ſet their affections on the corruptible things of this world, where the ruſt and moth doth corrupt, and where thieves break thorow and ſteal, * but to lay up their treaſure in heaven, where neither ruſt nor moth doth corrupt, and where thieves do not break thorow nor ſteal; and where they are certain to be * free citizens of the heavenly *Jeruſalem*, whoſe builder and maker is God, * in whoſe preſence there is fulneſs of joy, and at whoſe right hand there are pleaſures for evermore. And thus ſhall it be with them, when thoſe who here in this life * have been clothed in purple, and fared deliciouſly every day, ſhall (with the hypocrites) ſcorch and burn, * and cry in torments for lack of a drop of water to cool their tongues.

* Matth. 6. 19.
* Verſ. 20.
* Heb. 12. 22. Chap. 11. 10.
* Pſa. 16. 11
* Luke 16. 29.
* Verſ. 24.

Theſe, and the like, are the proper fruits proceeding from this well-meaning Diſcourſe, wherein every man may vary according to his own genius, and neceſſity of occaſion.

And that it may have plentifully ſuch happie and deſirable effects, The Al-

Almighty God in mercy bleſs it to every man, woman, and childe, that ſhall be any way partaker thereof. *Amen.*

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## *Laudate Dominum.*

***Admiremini omnia Opera ejus, & Verbo ejus contremiſcite.***

* * *

FINIS.

* * *

# The Contents.

## Chap. I.

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## Chap. II.

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*clusion of the whole diſcourſe.* P.111.

*That the weak Traveller in this his Celeſtial progreſs may not ſtumble, or be at a ſtand, I have made the way ſomewhat ſmoother, by the explication of ſome words not familiarly uſed, which he may meet withal in the precedent Diſcourſe.*

## A

**Afflux**, a flowing together.

**Aerial**, belonging to the air.

**Animals**, thoſe things that move upon the earth, and have beſides Augmentation, either Senſe onely, or both Senſe and Reaſon; as all kinde of Beaſts, and Man.

**Antipodes**, people dwelling on the other ſide of the earth, with their feet againſt ours.

**Apogea**, a point in the heaven, when any Planet is furtheſt from the Centre.

**Apogeiety**, furtheſt diſtant from the earth.

**Approximation**, a drawing neer.

**Archimedes**, a Geometrician of wonderful skill.

**Architect**, a Builder, or chief Workman.

**Aries**, one of the twelve Signes.

**Artifice,** the skill or ability of an Arts-man.

**Aſpect,** its form and figure which it ſhews to another body.

**Aſperſe,** to ſprinkle, beſmear.

**Aſtrolobe,** an Inſtrument whereby the motion of the Stars is gathered.

**Aſtrologie,** a Science teaching the knowledge, vertue, and influence of the Stars.

**Aſtronomy,** a Science teaching the knowledge of the courſes and motion of the Planets and Stars; and their diſtance, greatneſs, and form.

**Atome,** any thing ſo ſmall, that it cannot be made leſs.

**Attractive,** having power to draw.

**Attrition,** rubbing of two ſolid things together.

**Axletree,** an imagined Line from the one Pole to the other, drawn thorow the Centre.

B.

**Baſis,** a foundation.

**Benign,** gentle, favourable, friendly.

**Bitumenous,** an oily ſubſtance quickly taking fire.

C.

**Calefaction,** heating.

**Cancer,** one of the twelve Signes.

**Capacious,** large, containing much.

**Capricorn,** one of the twelve Signes.

**Celeſtial,** heavenly.

**Character,** a mark, ſigne, or deſcription.

**Circumference,** a Circle, whoſe every part is equidiſtant from the Centre.

**Circumvolution**, a turning or wheeling about.

**Circular**, that which is round in compaſs.

**Claritude**, clearneſs.

**Climats**, a particular ſituation of any Country, in reference to the Poles and Æquator.

**Cohibition**, a letting or forbidding to go.

**Columns**, pillars.

**Combinations**, a joyning or confederating together.

**Compreſſion**, a preſſing or thruſting together.

**Computed**, accounted or calculated.

**Conjunctive**, which knitteth or faſteneth together.

**Conſpicuous**, eaſie to be ſeen.

**Conſtellation**, a certain number of Stars making up a certain Figure given unto it for diſtinction-ſake.

**Coſmography**, a deſcription of the whole world.

**Conſtringent**, binding, as froſt bindes the water.

**Cubit**, the length of the bend of the arm to the end of the little finger, which is a foot and a half.

## D.

**Daedalus**, a famous Artificer, the father of *Icarus.*

**Degrée**, a Degree is 60 minutes or miles; and in the heavens it is the 360 part of the Zodiack.

**Demonſtration**, an eminent and undeniable manifeſtation of any thing.

**Demonſtrative**, that which declareth any thing evidently.

**Deſpicable**, a thing to be deſpiſed.

**Dextrous**, nimble, skilful, quick.

Di

**Diameter,** thickneſs, or a ſtrait line paſſing between the middle of a Figure, dividing it into two equal parts.
**Diametrically,** in a direct line.
**Dictate,** to endite what another writes.
**Digits,** Figures in Arithmetick.
**Digreſſion,** a going from the matter in hand.
**Dimenſion,** a true meaſuring of a thing.
**Diurnal,** daily.
**Dragon,** a Conſtellation ſo named.

## E.

**Eclipſe:** interpoſition of a dark body between th eye and a light body.
**Ecliptick Line:** a Line in which the Sun alway keeps his courſe: which Line runs thorow th middle of the twelve Signes.
**Efficient cauſe:** that makes or produceth an thing.
**Ela:** the higheſt Note in the Scale of Muſick.
**Elemental:** belonging to the Elements.
**Eliptical:** belonging to a crooked line.
**Emanation:** a flowing from any thing.
**Empyrean:** the higheſt heaven above the firma ment.
**Endenized:** made free.
**Epitome:** a ſhort gathering of a matter in writin
**Equidiſtant:** of like diſtance.
**Eſſentially:** of the nature or eſſence of a thing.
**Evince:** to clear by argument.
**Eccentricity:** not having Centres alike.

**Exhalations** : a fumy ſmoak hot and dry , drawn out of the earth by the heat of the Sun , or other Stars.

**Ecſtaſie** : a trance, or aſtoniſhment.

**Extraction** : drawing forth.

## F

**Furlong** : a meaſure uſed in Geometry, eight of which make a mile.

## G

**Genuine** : true and natural.

**Genius** : a term ariſing from the ſuppoſition of every mans having a Guardian-Angel taking particular care of him, called his *Genius*. Others conceive it to import no more but the inward motions and ſuggeſtions of a mans ſpirit.

**Geometry** : one of the ſeven Liberal Arts, converſant about meaſuring the earth, and proportioning Figures.

**Globe** : a round bowl , or the deſcription of the world made in ſuch a form.

**Globous** : round as a Globe.

**Gradations** : a going by ſteps.

**Gradually** : by degrees.

## H

**Habitually** : ariſing from a habit, begotten by frequent actions.

**Hemiſphere** : that part of the heaven which is ſtill to us viſible.

## I

**Igneal** : or fiery.

**Illuminated** : enlightned.

**Imagery** : painted, or that which is conceited in the minde.

**Immaterial** : without matter.

**Immenſe** : that cannot be meaſured , or that is o vaſt extent.

**Imperceptible** : not to be perceived.

**Imperial** : imperious, ſtately, Lordly.

**Impreſſions** : figures or repreſentations of thing appearing in the heavens, clouds, *&c.*

**Impulſion** : a forcible motion from another.

**Incounter** : moſt in oppoſition.

**Influence** : a flowing in ; power which Planets an Stars have over inferiour things.

**Inherently** : grounded in the ſubſtance of acciden

**Interpoſing**
**Interpoſition** } putting or coming between.
**Interpoſure**

**Intrinſecal** : that which is within, or belonging the eſſence of any thing.

**Irregular** : out of order or courſe.

L

**Lares** : Tutelar-gods, that were protectors of a mily.

**Libra** : one of the twelve Signes.

**Locality** : the place of any thing.

M

**Magnitude** : greatneſs.

**Mathematicks** : the Arts of Arithmetick, Muſ Geometry, Aſtronomy, Aſtrologie , and Coſ graphy